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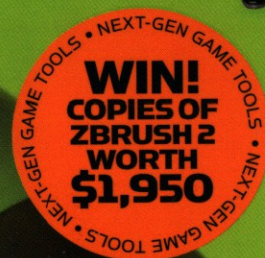
THE MAGAZINE FOR 3D ARTISTS

360

Great X-pectations

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of games artists for the better?

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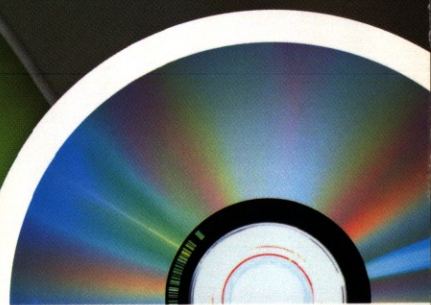COPIES OF
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360: Great X-pectations

MICROSOFT'S XBOX 360 games console is set for a November release in the US, and it's been impossible to avoid the hype. News programmes, websites and games magazines have proclaimed this to be a revolution in home entertainment, with extraordinary graphics, immense processing power and a whole new level of realism. However, what does the new Xbox mean for you, as a games artist? Will the 360 turn your job on its head and make your life easier, or will it just complicate your workflow? In our in-depth feature, starting on page 36, we reveal the facts you need to know, and get the lowdown from three developers working on launch titles.

One thing that the next-gen consoles promise is hundreds of characters on screen at any one time, and our lead tutorial reveals how you can create, texture and optimise a low-poly robot for instancing in a game engine, in order to create an instant droid army. Get started on page 46 now!

www.xbox360.com
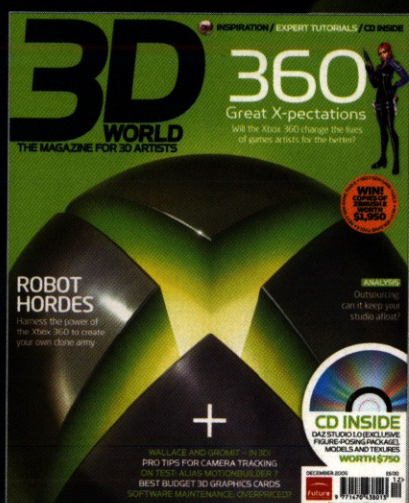
360
Great X-pectations

Just routine maintenance?

BUNNY BOILERS
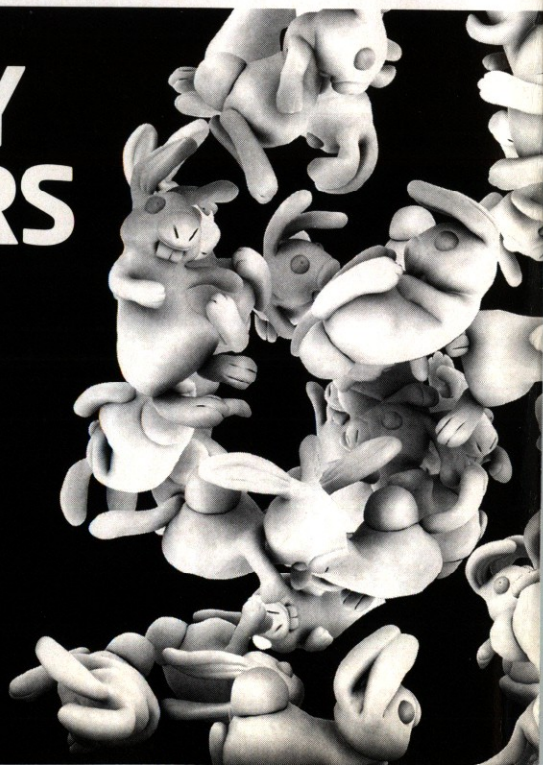
Robot hordes

046 We uncover the secrets of the next-gen game developers and reveal how you can create a huge army of robots using *3ds Max*!

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SEE PAGE 063 • SEE PAGE 063 • SEE PAGE 063 • SEE PAGE 063 • SEE PAGE 063 •

Camera tracking

TUTORIALS All the tips you need to master the art **058**

Night rider

SHOWREEL Things go bump in the night in this indie short **110**

Blood simple

LEAD Q&A Brush up on your *CSI* jargon and create realistic blood effects **064**

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REGULARS

ON THE CD

- *DAZ Studio* and **Silver-Wings models worth over $750** SEE PAGE 114

Editor's perspective

On a map, X indicates buried treasure. In ratings systems, it denotes something adult and erotic. And in pop cultural shorthand, it describes the generation that formed computer games' first, and most avid, consumers. In short, if it were possible to pack any more sociological significance into a single letter of the alphabet, Microsoft's Xbox brand management team would have spontaneously combusted long before now, uttering tiny cries of ecstasy.

Yet, perhaps the most important connotation of the letter X – currently starring on our cover in the shape of the Xbox's successor, the next-generation 360 – is something hidden, or unknown. This is ironic since, actually, quite a lot is known about the Xbox 360. Two months before it becomes available in the shops, the console itself is already familiar to consumers through the pages of a thousand gadget magazines and websites. And, of course, the technology press has had a field day with its internal workings ever since the system specification was first officially announced back in May.

What is not well known, however, is the effect that the Xbox 360 will have on the people who have to work most intimately with it: namely the 3D artists on next-generation titles. The power to push 500 million triangles per second is certainly impressive, but what does it mean when you're the person employed to produce all that geometry?

In our cover feature, which starts on page 36, we set out to answer this question. We persuaded three very different studios currently working on Xbox 360 titles – the Microsoft-owned Rare, third-party developer Blitz Games and indie outfit PomPom – to take time out from their development schedules and tell us what life is like at the sharp end.

As you might expect, the new graphical capabilities of the console feature prominently. Yet, among the talk of lighting models, post effects and parallax mapping, you'll also find the human stories, like that of the one-man developer able to move from fixed textures to shaders for the first time in his life.

In addition to celebrating the 360's cinema-quality visuals, our interviewees sound a necessary note of caution. As well as the power of High-Definition, you can read about the difficulties of working at 1,280x720, and the £80,000 Bizarre Creations spent on new servers to handle the volume of data required for *Project Gotham Racing 3*. And, as the company's Technical Director, Walter Lynsdale, puts it: "There's only a certain amount of detail that developers can afford to put into a game. Are you really going to see more sales by hiring another 10 artists to render the buttons on a character's shirt?"

So what's the real story of the Xbox 360? The incredible graphical opportunities it offers, or the challenge of realising those opportunities? Without us, the console would just be yet another silver box. But is it time for 3D artists to get X-cited?

JIM THACKER Editor
jim.thacker@futurenet.co.uk

LETTER OF THE MONTH

Having just bought issue 69, I have just one question for you: what's with all the sexy 3D models of women? Don't get me wrong. I'm a great fan of the female form. I guess there are a few guys out there who would rush to buy the magazine for the cover image of some hot cyber-girl and dream of interfacing with her, but for the rest of the population, it's actually quite awkward reading the magazine in public. Try producing this month's magazine on the underground and see the looks you get. It's like being a dirty little cyber-pervert.

Please can you leave this stuff up to those guys who bend women over in *Poser* and give them chains and gimp masks. Put something impressive on the cover that doesn't try to arouse computer hackers with internet girlfriends.

When you guys put the image of the liquid human created in *RealFlow3* on the cover [issue 64], lots of people who know nothing about CG were stunned by it. So please stop making us look like dirty little men by buying your publication. I have the internet – I can get my own porn.

Ben Clark, via email

Thanks for all your feedback on issue 69. Of all the cover images we've run in the past year, this was the one that caused the most comment, and which most sharply divided opinion among you. The 'anti' lobby divided into two camps: those who thought we shouldn't have used the image because it was created in *Poser*, and those who criticised it on grounds of taste. Regarding the first point, we can only reiterate what Adam Benton said in his cover tutorial: "If you're a commercial illustrator with stringent deadlines, you'll use the tools available to get the job done." Its reputation as a hobbyist's package notwithstanding, *Poser* is a perfectly valid tool, and one that many artists use in their professional work, particularly in conjunction with other packages. Adam's tutorial explored some of the issues involved in setting up such a mixed software workflow. For those objecting on grounds of taste, we can only say that we've taken your comments onboard, though tastes do vary, as the letter below indicates. In the circumstances, this month's prize is perhaps ironic, but a copy of the *d'artiste* book on figure art is on its way to Ben now...

● Our cover star from issue 69: for 'dirty little cyber perverts' only?

LETTER OF THE MONTH

Congratulations to Ben Clark, who wins a copy of *d'artiste: Character Modeling*, published by Ballistic Publishing. This authoritative book uncovers the techniques used by celebrated artists Steven Stahlberg, Pascal Blanché and Francisco A Cortina, through step-by-step tutorials, personal galleries, and collections of work from other invited artists. Further tutorials cover skin shading and creature modelling. www.ballisticpublishing.com

F + I = A

> I really like the cover of issue 69, but I've just noticed something. From a distance, or on the JPEG on your website, the word 'final' in 'final fantasy' looks like something a little different! The 'f' and the 'i' join together nicely ...

Rob Carney, via email

Ahem. If you're mystified by what Rob means, check out the appropriately low-resolution JPEG at the foot of this page. Let's just say that this probably wasn't the kind of fantasy Monotype's Sebastian Lester had in mind when he designed our cover font, Neo Tech.
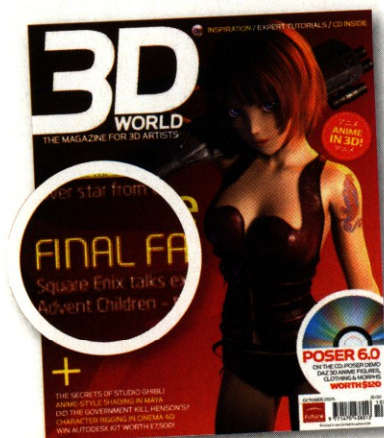
● Our cover from issue 69. Move the page back, unfocus your eyes, and ... let's move on to the next letter, shall we?

TRIALS AND TUTORIALS

> I thought that a magazine with a reputation such as yours would have done something as simple as actually checking which parts of a software package were available in the trial version used in a tutorial. I was wrong.

In issue 67, you included a trial version of *Vue 5 Infinite* on the CD. This is a wonderful piece of software, although it is limited, as all trials are. However, this isn't the problem. The problem lies within the accompanying tutorial. The author, Eran Dinur, has obviously not used the trial version, or he would realise that certain parts are not available until you purchase the full product. This means that anyone who hasn't paid $599 cannot complete the tutorial as laid out in the magazine.

Specifically, I quote the following sentences from step 11: "Select the plum tree from the plant browser and click OK. Repeat this step to add a rural maple tree." What Mr Dinur fails to realise is that neither of these plants are available to those poor individuals who are actually using the version of the software included on the CD. They're only available to users who have purchased *Vue 5 Infinite*. This makes that section of the tutorial obsolete, unless you choose to use a different plant (which alters the appearance of the finished piece).

As someone who spent $15 on this issue specifically to learn how to use *Vue 5*, I was disappointed to discover that I would have to alter the very tutorial that I was supposed to be learning from. I hope that, from now on, your editors will check that the tutorials they offer are actually usable with the software they supply.

Patrick Hoscheid, CEO/Creative Director, Ethereal Ink

Due to the timescale in which an issue of *3D World* is put together, some tutorials' accompanying cover software have to be written before the final build of the product is available. This is often the case when the software is available exclusively via our CD. In these cases, unfortunate mistakes can occur. However, the problem you mention was spotted before issue 67 went on sale, and the missing trees are available as a free download from the webpage on which you register the trial edition of *Vue 5 Infinite* (**https://secure.e-onsoftware.com/Products/vue5infinite/trial**).

THE PRICE IS WRONG

> I'm in a position in my life where I'm thinking of a career change, and having a passion for movies and effects, I want to learn the software and techniques. Unfortunately, I'm in full-time employment and have only my spare time to endeavour to master *Maya*, *LightWave* or *Cinema 4D* – not to mention *Poser*, *ZBrush*, and so on …

Then there's the question of cost. Why on earth does 3D software cost so goddamn much? This puts the possibility of purchase way out of the humble enthusiast's reach. I have high praise for Alias giving us the opportunity to get to grips with *Maya* via the PLE version, but why miss out fluid dynamics?

And finally, there's the matter of books. *Maya* has a really lovely series of training guides, but at £40 each! [*Actually, you can get the official ones on Amazon.co.uk for as little as £13 – Pedantic Ed.*] OK, rant over – keep up the good work on the mag!

Oly Scott

The subject of the cost of 3D software is one we return to again in this issue. You can read our analysis of the current pricing policies of the major manufacturers on page 16.

FIND AND REPLACE

> If, like me, you have been a subscriber to *3D World* since issue one, the chances are you have some 70 CDs lying about somewhere in your home. Other than the clutter, the big issue is finding anything on those CDs. Let me explain.

At some point in the course of a project, you get stuck needing something, be it a model, a texture, a BVH file or whatever. Your first instinct is to go out and buy it. A quick search at Turbo Squid shows that the very item you need is available for $50. Great, another $50 (like you have extra money lying around after Siggraph, or upgrading to the latest version of *Cinema 4D/3ds Max/Maya*).

But then, you have an epiphany and remember that you saw just the same thing 8-12 months ago on a *3D World* CD. Happy days! Your project and your wallet are saved. Uttering a silent prayer of thanks, you start your treasure hunt.

After sifting through about the 20th magazine, doubt sets in. Was it on the CD or was it an article about it that I remember reading? Was it a demo or a fully functional program? Was it even in the format I need, and will it run on a Mac or a PC? Did I miss it in the index? Should I look through the mag, or do I stand a better chance of finding it by loading each of the CDs into my computer? What was I looking for again? By this stage, Turbo Squid is sounding pretty good.

My point is that the *3D World* CDs are becoming quite the resource for CG assets, but only if you can index them. With this it mind, I've catalogued most of the CD contents (or at least, what's listed in the 'On the CD' section of each magazine). The results can be found here: http://home.comcast.net/~dianeangelini. If you're familiar with *Excel*, you'll be able to make use of the filter buttons on the column headers in row one. A few clicks and you'll find exactly what you're looking for. Give it a go and let me know what you think.

Dave Angelini, via email

A big thank you to Dave for compiling this useful resource, which he hopes to keep maintained over the course of future issues. Data from our own spreadsheet of articles, interviews and reviews published in the magazine itself has now also been incorporated into the database, and can also be found in the Downloads section of our own website. **www.3dworldmag.com**.

FROM THE FORUM

> And finally, our regular round-up of the best threads on the *3D World* forum returns by popular demand. (Now please, let the dog go free.) This month, you've mostly been praising Art. Lebedev Studio's new programmable keyboard (**General Discussion > The king of keyboards**), arguing about the subject of our feature in issue 69 (**General Discussion > Final Fantasy 7 Advent Children**) and finding unusual sources for HDRI data (**General Discussion > Where to get a shiny ball**). *3D World*'s slightly delayed congratulations also go out to forum regulars **eddieellis**, who has just become a proud parent, and **3dgirl_natalie**, who's about to do the same. If you're new to the forum, and are wondering who all these people are, a rogue's gallery can be found at **General Discussion > Ooooh, look at you!** Be moderately afraid …

● An index of content from each of our CDs can now be found online, thanks to reader Dave Angelini
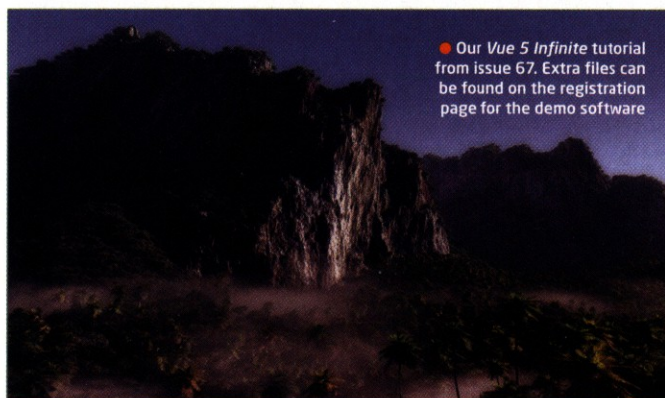
● Our *Vue 5 Infinite* tutorial from issue 67. Extra files can be found on the registration page for the demo software

3D WORLD
CD70

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TRENT TROMBLEY Red-Eyed Tree Frog
Softimage XSI 4.2, Photoshop

"I'm a student in my second year at the Center for Arts and Technology in Kelowna, Canada. My inspiration includes all art mediums that range from 3D to photography. Another huge inspiration comes from the natural world, such as the colour of a sunset and how amazing the world can be. Before I got into 3D, I was into comic book illustration, but it wasn't the path I wanted to follow, and it was only recently that I decided to make 3D modelling a career. The goal I was trying to achieve in this image was to capture the delicate nature and humorous appeal of the red-eyed tree frog. It was modelled in *Softimage XSI 4.2*, and the textures were made in *Photoshop*."

[e] trenttrombley@hotmail.com

CARLOS AGELL SOGBE The Thinker – Retrongutan
Cinema 4D 9, Photoshop CS

"I'm an architect, stage designer and graphic designer for theatre and TV. Creating and conceptualizing future worlds, machines and vehicles is one of my favourite hobbies and pleasures in 3D, and I'd love to work more seriously in this field in the not too distant future. The Retrongutan was initially an art piece made for the 'Monthly CG Challenge' at www.C4des.com. The theme was simply 'robots' and I decided to present an animal-inspired robot featuring a 'retrofuturistic' style. After some months, I revised the model and thought it would be nice to take that technical/futuristical image and have some fun putting the robot in a stereotypical classical pose as Rodin's *The Thinker* in a light-controlled studio-like set-up."

[e] agell@mac.com
[w] http://homepage.mac.com/agell

ERNIE ERDAWATY SERNAN
Colors
3ds Max 7, V-Ray, Photoshop

"Born in 1983, I studied Digital Media Design, specialising in Feature Animation in Singapore. Working now as a CG artist at Sixtrees Viz Comms, I'm occasionally inspired to recreate the visuals I see every day. *Colors* was created after being inspired by a photograph. With the spread of colour, I find it refreshing and eye-catching to portray its realism on paper."

[e] ernie@sixtrees.com.sg

NIELS VAES Greets from Spain
Vue 5 Infinite, Photoshop

"I'm 20 years old and I've been playing around with 3D software for about three years. Whatever skills I acquired over the years are self-taught. I made this image for my personal enjoyment, like most of the 3D work I undertake. One of the best things I like about *Vue* is the great results you can get without any effort at all. This picture was made in about three hours, render time included. "

[e] nielsvaes@gmail.com
[w] http://nielsvaes.sytes.net

CHRIS WILSON Lilly
3ds Max, Photoshop, Combustion

"Lilly is a background character for my animated short, *The Chronicles of Nerm*. I'm a part-time independent filmmaker and a part-time employee of Capstone Technology. The satisfaction and feeling of accomplishment of a completed animation drives me through to the eventual development of my work."

[e] chris_rw@hotmail.com
[w] www.cwanimation.com
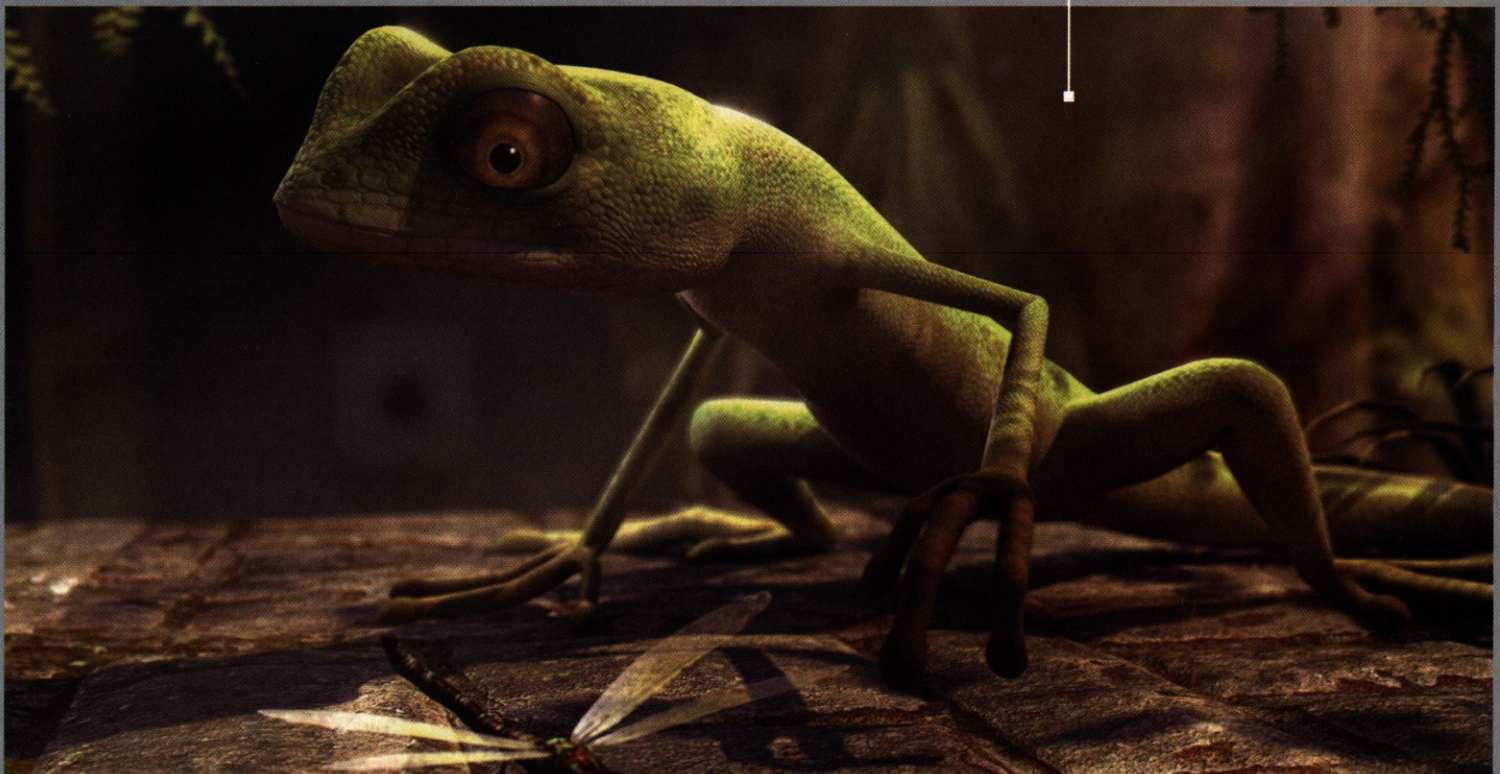
LAURENT PIERLOT Kill The Chicken
ZBrush, Brazil r/s, 3ds Max, Photoshop and
Digital Fusion

"I'm a 3D artist from France. I used to study
graphic design before I entered Supinfocom
(French animation school), and I'm currently
working for Blur Studio in the USA. My
inspirations are mostly European expressionists
such as Otto Dix, Kandinsky, Klimt or Egon
Schiele. I found in *ZBrush* the perfect tool
to express my ideas. Because it's so close to
sculpting, the challenge is to transfer that into
3ds Max without losing too much detail. I also
like to work fast, so I do a lot of tweaking in
Photoshop. For my future stills, I'm looking for a
render closer to the collage techniques."

[e] laurent@blur.com

JONATHAN GOH Shield & A Strange Plant
3ds Max, Brazil r/s and *Photoshop*

"I'm a high school senior in Vancouver, Canada, and have been playing around with *3ds Max* for three years. My love affair with *Max* began when I opened a copy of this very magazine! A Strange Plant was an experiment in subsurface scattering; the orange parts of the 'plant' uses *Brazil's* wax material lit by self-illuminated spheres set inside the white structure. The shield bear's the cross of St. George, and was inspired by my school's emblem."

[e] jontheg@gmail.com
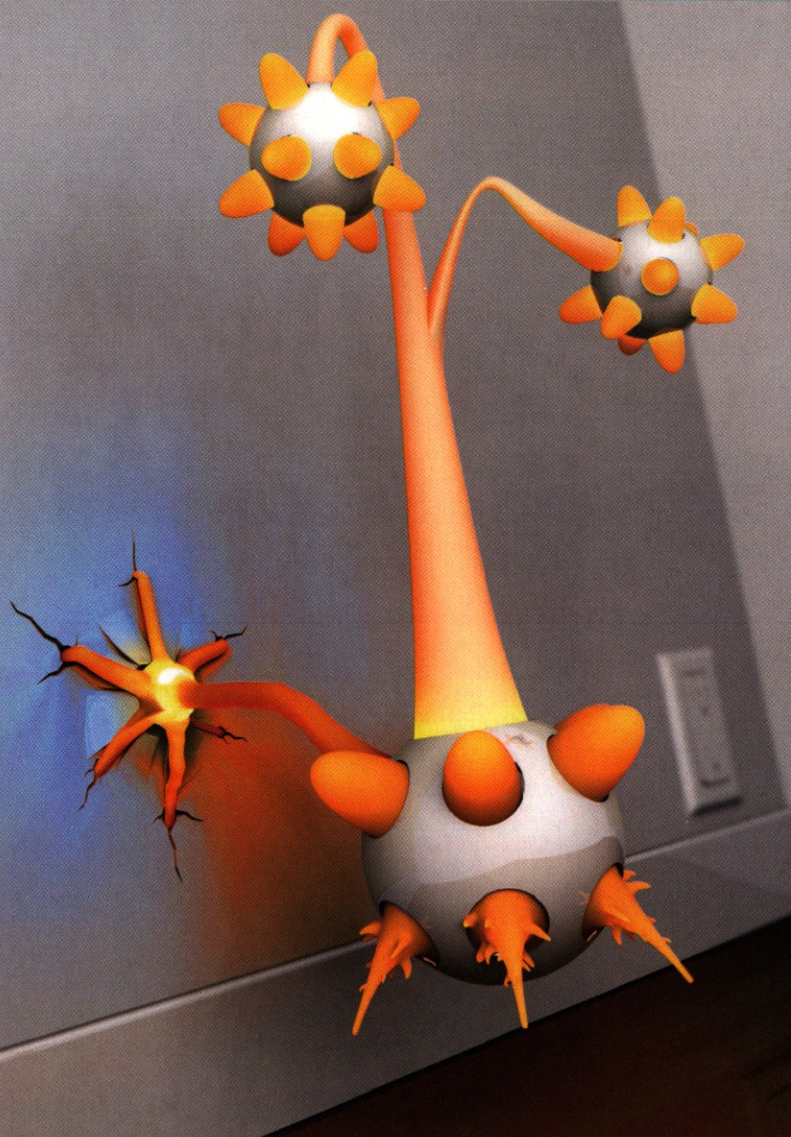
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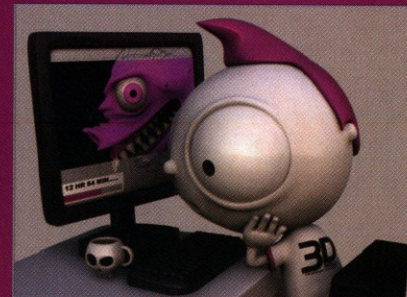
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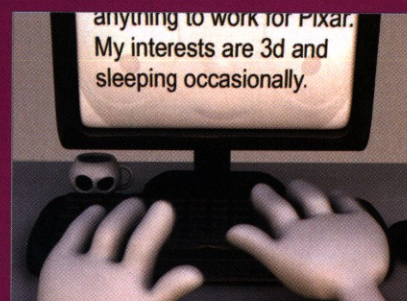
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03 **SEND IT IN...**
If the attachments are less than 9MB, you can email images to us at 3dw.exhibition@futurenet.co.uk. Larger files can be burned onto a CD and posted to us at: 3D World, Future Publishing, 30 Monmouth Street, Bath, UK

Just routine maintenance?

SOFTWARE Developers increasingly promote annual maintenance contracts, combining upgrades and technical support, as the way to buy 3D software. But do such deals offer users best value for money?

With the swathe of product releases in the wake of this year's Siggraph, many people are currently looking to upgrade their 3D software. The vast majority of outright purchases will come from the growing 'mass market' sector, not major studios. According to figures from Autodesk and Alias, around 80-90 per cent of established users now update their software automatically, via an annual contract. But are they right to do so?

Typically, maintenance contracts take the form of a year's technical support (via telephone hotline or email), a year's worth of upgrades as and when they appear, and sometimes access to learning and support materials too.

"For most users of software, the biggest investment is in integrating the tools into the production pipeline and training staff to use them," said Seamus Morley, CEO of UK distributor Techimage, which has seen almost every one of its *3D-Equalizer* and *RenderMan* purchasers sign up for maintenance. "Once that's been achieved, it makes sense to keep using the same software, provided the manufacturer ensures that functionality improves year on year."

Prices differ between developers, and there are various levels of support available, but a typical annual contract fee is around 10-20 per cent of the list price of the software. The cost of buying full-point upgrades individually is higher: around 20-30 per cent of the list price. At face value, maintenance contracts offer a considerable cost saving. But would facilities otherwise purchase each individual upgrade?

Mark Taylor, head of Bristol-based animation studio A Productions, has just upgraded to the latest version of *3ds Max* through reseller

bluegfx. "We got by without subscription up to now," Taylor said. "I suspect [the 3D vendors] have identified it as a way of guaranteeing regular income from customers who might otherwise sit on a release for longer periods before paying to upgrade when required."

Many analysts see subscriptions as the answer to the massive marketing and advertising outlay that developers undertake to ensure customer retention, as well as an opportunity for them to receive income ahead of release dates. However, Patrick Greene, Softimage European Business Manager, highlighted other motivations: "Many of our maintenance customers are also on our beta list, so it helps us get accurate feedback about how people are using the software, what their needs are, and how we can improve future releases."

"It's a win, win, win situation," claimed Patrick Jocelyn, EMEA Director for Autodesk's Media and Entertainment Division. "As customers are effectively tied into subscription for a year, resellers can concentrate on adding value in other ways. We clearly benefit, but client satisfaction is also very important to us." In particular, Jocelyn cites the ability to determine operating costs a year in advance as a key benefit to the customer.

As more studios sign up for contracts, developers increasingly come under pressure to release upgrades regularly in order to justify their subscription fees. Some users believe that this compression of the development cycle results in less substantial releases – a claim that developers are, unsurprisingly, quick to refute. "You're cascading a lot of good development into a product, be it custom engineering in conjunction with studios or planned engineering," said Mark Pammenter, Alias' Director for Entertainment Products EMEA. "It's not just a case of 'Oh, we've got enough stuff, we'd better put it out the door now.'"

> ## "AS CUSTOMERS ARE TIED INTO SUBSCRIPTION FOR A YEAR, RESELLERS ADD VALUE IN OTHER WAYS"
> **PATRICK JOCELYN, EMEA DIRECTOR, AUTODESK**

PLUGGED IN

SURVEY HELL

VFX management were forced to tackle a barrage of scathing, anonymous comments posted on the website Survey Hell last month. VFX artists voted for the worst facilities to work for, and around 20 international VFX houses were shamed. Fortunately for them, we don't have space to list them here, and the link has since been deleted, but one participant reckoned the survey cost the VFX industry $500,000 in lost productivity as staff read the results.
www.surveyhell.com

● Major developers increasingly promote maintenance contracts, combining upgrades with technical support, as the way to purchase 3D software. But do they offer better value for money than the alternatives?

14% Absolutely
14% Possibly
28% No
42% Unlikely

TALKING POINT | Are maintenance contracts good value for money?

"You don't need to be part of a maintenance scheme to survive; you just need to keep up-to-date with the latest technology. However, maintenance is often the cheapest way to do this. It's certainly cheaper and easier than having to upgrade individual seats of software. One release may be weak, the next strong, but so long as the software is moving forwards then that's fine."

Simon Kirk, Technical Artist

"Previously, you paid a lot of money for your application, had support included and upgrades were infrequent and cheap. Now your application is cheap, but you pay separately for support and upgrades are more frequent, so you spend more on them over the years. [It can be better to find] free support and only upgrade when the job demands it."

Anon, head of Maya/3ds Max studio

"Some users go for the latest version of everything. This can give them an edge in that they can access new technology quickly. The downside is that new software isn't production proven, so getting good results can be time consuming. But given that the pace of new developments in CG/3D has slowed, staying with the same software [on a contract basis] can make sense."

Seamus Morley, CEO, Techimage

However, users such as Mark Taylor feel that the benefits of maintenance depend on the volume of usage. Like many studios, both large and small, A Productions tends to work on projects that can be in production from two to four years. "During that time we won't want to interfere with the software version we're using as we usually rely on a large back library of characters and stock animation. We may choose to not use our upgrades unless we're entirely happy that it's not going to cause additional workload for the production pipeline."

"We've mainly viewed maintenance as an upgrade route," commented Simon Kirk, a Technical Artist on a full maintenance contract with Alias. "However, recently we've been using the Alias Insider Case Management option for some fairly hardcore support issues we've had. I think as the end-user expertise increases, the need for hotline support diminishes to the point of being almost irrelevant. It's valid in the early stages of product usage, but maybe a long-term user discount would be a good idea, or a 'no claims discount.'"

Vendors of mid-priced packages also take issue with the idea of annual contracts, particularly the way in which they tie technical support and software upgrades together. According to Perry Stacy, Maxon's UK CEO: "We offer free tech support because our product is easy to use and thus we get fewer support requests." Dan Farr, President of DAZ Productions, added that while he understood the complexity of some high-end software necessitated a significant financial commitment to supporting users, there were alternatives.

"We've found the online communities and our active DAZ forum to be very helpful resources, " he said. "They provide free support and often negate the need for customers to contact [us] directly."

Softimage's Patrick Greene agrees: "Some smaller shops or those whose work is not as time sensitive as the bigger production houses rely more heavily on online forums. That said, we still have a lot of smaller customers on maintenance, as well as high-end facilities. It all depends on the person and the type of support they're looking for."

IBC 2005

CONFERENCE 2D and 3D compositing tools and effects plug-ins come to the fore at IBC in Amsterdam, while 3D animation takes a back seat

While *3ds Max* vied for attention among Autodesk's headline products, *Maya* received only a scaled down presentation (in contrast to Siggraph) at a very small Alias stand. However, both Autodesk and Alias showed more than Softimage, who this year decided to skip the International Broadcast Convention (IBC) altogether.

Eyeon demonstrated *Fusion 5*, while Boris FX unveiled the latest upgrade of *Boris Red 4*, its 3D compositing and effects package anticipated to ship early next year.

Antics Technologies previewed the forthcoming version of its real-time pre-visualisation application, *Antics Pre-Viz 2*, enabling film and programme-makers to pre-visualise projects in an animated, real-time 3D environment. The PC toolset assists with story development, pitching, set design and production planning and boasts new programme pre-production tools developed with the BBC. New features include set builder Blueprint, studio cameras with collision detection and configurable cranes and jibs. Version two is scheduled for release at the beginning of 2006.

Early previews also came from effects developer The Foundry, who showed an alpha version of *Furnace 3 for Shake*. Plug-ins based on motion estimation algorithms and analysis are promised to extend the toolset with Lens Distortion, Motion Matte, Match Grade, DeBlur and a Splicer tool, among others, for matching two images together and automatically hiding the seam in texture or sharp line transitions. *Furnace 3* goes into beta in mid-October with a release anticipated before the end of the year.

Apparently, The Foundry is also considering developing a set of plug-ins specifically for the 3D sector with the focus on integrating 3D with live action.

In the meantime, both The Foundry (with *Forge*) and The Pixel Farm (with *PFClean 1*), have used motion estimation technology to develop new dust-busting tools.

The Pixel Farm also showed *PFMatch 2* for *Shake 4* (launched at Siggraph), providing *Shake* users with a fully integrated 3D tracking environment to complement *Shake 4*'s new 3D environment. It also adds the ability to export 3D cameras, including *Shake*'s camera, to other applications.
www.ibc.org

● Splicer stitches together arbitrarily shaped images or parts of an image to remove elements, generate backgrounds or create large, clean plates

GDCE 2005: PROBLEMS AHEAD?

SHOW The experts proclaim broken processes and possible solutions to the advent of advanced games development at this year's big event

Coinciding with next-gen production, the Game Developers Conference Europe demonstrated an industry looking for solutions to new problems.

A higher level view was provided by EA, which revealed, in the case of *Battlefield 2: Modern Combat* at least, it was looking at a sevenfold increase in geometry resolution as well as the introduction of advanced lighting techniques, such as self-shadowing, blooms and depth of field. The

main problem, explained producer Simon Harris, was having the right art direction to handle an increase in realism in a way that didn't break the gamer's illusion. "Realism is more than just detail," he said. "Every step we take forward in terms of fidelity can also show up our shortcomings."

Close to Xbox 360 launch, Microsoft's keynote speaker, Chris Satchell, preferred to highlight the company's focus on production tools. "The process of making games is broken," he said, revealing *Visual Studio* will be better integrated into the XNA toolchain to provide source control for assets and interfaces into 3D packages such as *3ds Max* and *Maya*. "It's not sexy, but it's the meat and veg you deal with every day," he explained.

The highlight of the conference was the presence of Namco's Keita Takahashi. Trained as a sculptor, he had worked for the company for four years without shipping a title before finally coming up with the idea for *Katamari Damacy*, a game where you roll a ball around the world, picking up objects as you bump into them (it will finally get its European release under the name *We Love Katamari*).

"I don't really like games much," Takahashi deadpanned via his interpreter. "You don't need games to have fun. Possibly you don't need games at all."
www.gdceurope.com
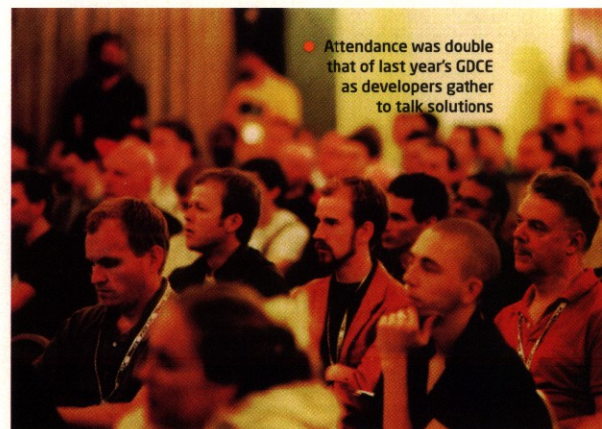
● Attendance was double that of last year's GDCE as developers gather to talk solutions
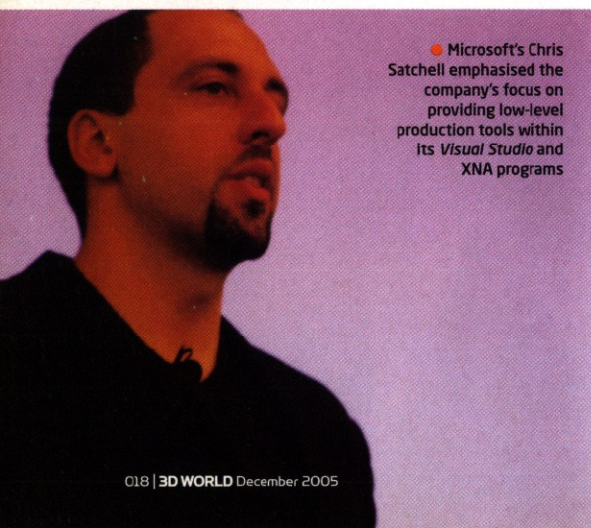
● Microsoft's Chris Satchell emphasised the company's focus on providing low-level production tools within its *Visual Studio* and XNA programs
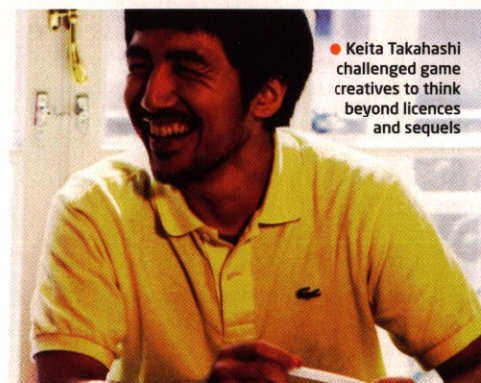
● Keita Takahashi challenged game creatives to think beyond licences and sequels

EVOLUTION
MARCHES ON...

CINEMA 4D
R 9.5

"More power, more speed, more grace." That was our goal. Here is the result.

New light sources and settings (e.g. Ambient Occlusion and Area Lights) make even more realistic images possible – at speeds of up to four times faster than with CINEMA 4D R9.1. So that you can take full advantage of this new level in image quality, CINEMA 4D can now output images in glorious 32 bits per channel colour depth. And there's an additional multi-pass link to the high-end compositing tool Shake.

CINEMA 4D is now even easier to use and more efficient. The new full screen mode offers you more workspace, and the new Content Browser gives you a complete overview of all your 3D files.

A particular highlight of the Advanced Render module is SKY. With just a few clicks of the mouse, SKY lets you create and animate realistic high-end atmospheric environments, including customizable 3D clouds.

Visit us online for more exciting details and to see what else is new in CINEMA 4D R9.5.

WWW.MAXON.NET

Aspidium – made with CINEMA 4D © by Axel Ritter

MAXON

Maxwell strives for total realism

SOFTWARE Maxwell Render sets out to reproduce the behaviour of light in a completely accurate way

Next Limit is set to release the first version of *Maxwell Render* at the end of October. Based on the physics of light, the new renderer's algorithms are claimed to reproduce the behaviour of light with absolute accuracy. All elements such as light emitters, materials shaders and cameras are apparently based on physically accurate models.

Maxwell achieves high quality renders by modelling light as a spectrum of frequencies and by considering all interactions. Therefore, it is automatically able to create effects such as lens flare, dispersion and lens distortion. Other renderers tend to make many more approximations by considering just three spectral bands (RGB) and relying on various tricks to achieve similar effects.

However, TDs working on visual effects for film routinely rely on lighting cheats to art direct an image in ways that are not strictly physically accurate: for example, by repositioning reflections or shadows without changing the main lighting. Therefore, they could feel somewhat restricted by the software if there is no option to override the defaults, or write custom shaders. *Maxwell*'s render times are also still unproven: it may be that the renderer is just too accurate for practical use in some industry sectors. *3D World* put these points to Next Limit, but the company was unavailable for comment when the issue went to press.

Plug-ins have been developed for almost all the major 3D, CAD and visualisation programs with more to be supported soon. A forum has also already been established and is proving very active – especially among users of *3ds Max* and *Cinema 4D*.

Maxwell Render costs $995 for Windows, Mac and Linux. It can be pre-ordered for $495 before 31 October.

www.maxwellrender.com

● While rival apps rely on tricks, *Maxwell* achieves high quality renders by modelling light as a spectrum of frequencies and considering all interactions

AI.IMPLANT 3.5

SOFTWARE AI toolset to boost next-gen gaming

BIOGRAPHIC TECHNOLOGIES' latest real-time artificial intelligence release, *AI.implant 3.5*, unifies the company's multi-market offering of games, simulation and animation into one toolset for authoring AI, SDKs for real-time apps and run-times for deploying applications on platforms including the Xbox 360. *AI.implant 3.5* includes motion quality improvements enabling characters to move in more natural ways, while its new time unit-independence has been well received by developers. "We look forward to some really amazing next-gen games coming out," commented company founder and president Dr Paul Kruszewski.

BioGraphic Technologies has also collaborated with the Research of Virginia, Analysis and Simulation Center (VMASC) to launch the

AI.implant powered *Crowd Federate*. The psychologically-based crowd model is a convergence of military and gaming simulation technologies and provides 'out of the box' access to complex urban crowd behaviours. With modern military operations often involving small units in urban settings, crowds of non-combatants are playing an increasingly recognised role in operations. *AI.implant* costs from $10,000.

www.biographictech.com

● *AI.implant* boosts next-gen games with more natural character motion

VFX Bake Off

AWARDS Syflex, ILM and Pixar compete in Oscars race 2006

The Scientific and Technical Awards Committee of the Academy of Motion Picture Arts and Sciences has selected 17 scientific and technical achievements for Academy Awards consideration.

The list has been announced so that any individuals or companies who feel they have similar technology or claims of prior art have the opportunity to also submit their own technology for review.

Among the current selection is Syflex with its cloth simulator, as well as Pixar's cloth simulation software and subdivision surface modelling technology. Industrial Light & Magic is also being considered for two of its in-house developed technologies: image-based modelling and ambient environment
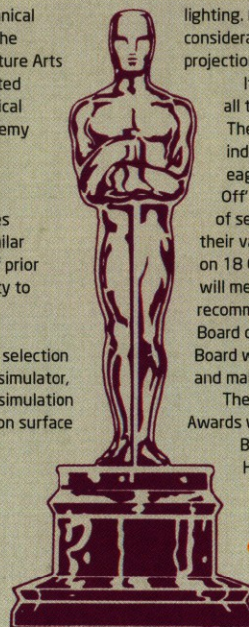
lighting. Further technologies under consideration cover digital film, projection systems and camera cranes.

It's now a nail-biting time for all the companies concerned. The Hollywood visual effects industry will gather for the eagerly anticipated annual 'Bake Off' to watch the demonstrations of selected achievements by their various development teams on 18 October. Then the committee will meet in December to vote on recommendations to the Academy's Board of Governors. Thereafter the Board will assess the technologies and make its final awards decisions. The Scientific and Technical Awards will be presented at the Beverly Hilton Hotel in Beverly Hills on 18 February.

www.oscars.org

● Cloth sims, modelling tools and ambient lighting are all on the Oscar radar for the Scientific and Technical Awards 2006
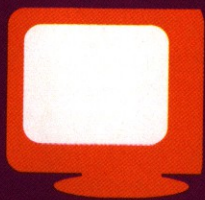
WEBSITE OF THE MONTH

www.depthcore.com

depthCORE is an international art collective and online community focused on modern and abstract art, incorporating design, photography, animation and audio.

Every 35-50 days, depthCORE releases a collection of artwork contributed by members. These packs contain anything from 40 to 200 selected works - and include digital art, photography, skins, music, animations and collaborative works.

The packs are themed (recent examples include Technica, Nirvana, Subvergence and Rebirth), as each member contributes their own interpretation of a central theme or concept. Also accompanying each pack is featured content consisting of a focus on a member and several artworks in the 'spotlight'.

The themed collections are then made available for download to members of the website.

depthCORE was established to provide a showcase for the best in abstract craftsmanship, with the primary goals of breaking conventions and pushing boundaries. Whilst
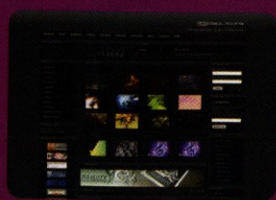
depthCORE does accept applications, the majority of its artists gain membership via private invitation as opposed to their own request. ●

Further sites...

http://olivierpinol.ifrance.com

The stunning short film ASC has been posted at this site by its multi-talented French director Olivier Pinol. As well as directing, Pinol took on responsibilities for the film's art direction, CG supervision and lighting set ups. ASC was created in *LightWave 3D* by a 14-strong student team trained by Pinol.

www.halbertram.com/interact/index.htm

Hal Bertram, former digital supervisor at Henson's Creature Shop, caused quite a storm at Pixar's user group meeting at Siggraph this year. His 'Stupid *RAT* Tricks' presentation was anything but stupid, and delighted all *RenderMan* aficionados present in the room. If you're a *PRMan* user, then Hal's site is a must.

HYPERMATTER 2

SOFTWARE By using HyperMatter for Maya 2, objects can apparently be made to do anything real objects can do, and more

OPL HAS RELEASED version two of its physically based deformer, *HyperMatter for Maya*. The intuitive plug-in allows animators to ascribe to objects a sense of 'materiality' or 'substance'.

Animators are able to easily add secondary, inertial type deformations to key-framed *Maya* geometry. For example, they can skin skeletal forms or add cartoon style squash-and-stretch or wobble effects to moving objects.

Jonathan Smith, who heads up OPL, says *HyperMatter for Maya 2* is all about 'controllability'. All *HyperMatter* constraint parameters and material parameters can now be keyframed through *Maya*. The Orientation constraint, used with the Fix and Suspend constraints allows curling and twisting effects to be simply and precisely keyframed and allows complete control over an object's deformation. The Glue constraint allows *HyperMatter* objects to be glued and unglued during animation, while the Viscosity constraint can be used for reducing the motion of *HyperMatter* objects. The Group Editor function enables constraints and operations to

● Using a single *HyperMatter* object, this elephant could be skinned and deform in response to keyframed skeletal motion

be applied to groups of *HyperMatter* objects, and R3-Recordings allow instant evaluation or time-stepping of *HyperMatter* objects once physically based time-stepping has been performed.

HyperMatter objects can squash and stretch, be dropped and bounce off each other, all with fully deformational contact and collision detection. Animated objects squash and bulge under their own weight and show the effects of centrifugal and inertial forces upon them.

HyperMatter for Maya 2 is expected to cost around £750 and is scheduled to ship in October.

www.hypermatter.co.uk

PLUGGED IN

ZBRUSH 2.5
Not only has Pixologic been busy working with ILM to integrate its modelling, texturing and painting app *ZBrush* into the facility's production pipeline, but the developer has also delivered a new learning edition of the software and is now preparing for the imminent release of *ZBrush 2.5*. To top it off, Pixologic is giving away four copies of *ZBrush 2.5* to *3D World* readers. See page 63 for your chance to win.

www.pixologic.com

SyFlex 3.5 for Maya

SOFTWARE Now capable of 20 cloth sims in one night - on a laptop!

SyFlex 3.5 for Maya has begun shipping with new features including curve animation (hair), wrinkle maps, button constraint and paint constraint weights, plus self friction and map attenuation. *3D World* caught up with Gerard Banel, President of Syflex, while on his way to LA to make a demo for the Oscar committee (see opposite page). Apart from his obvious excitement, Banel reported a lot of interest in 3.5, that *SyFlex for LightWave 3D* was in the pipeline (though he couldn't confirm a release date) and that virtual 3D garment design software, *Haute Couture 3D*, was nearing the end of its beta phase.

SyFlex was also recently used by director Kory Juul to help craft his short film, *The Sandbox*, which premiered at the LA Short Film Festival last month. Juul said: "I did [my] five-minute CG short on my laptop and could only afford one pass of cloth per shot. I ran a sim, smoothed the polys, and used the artisan sculpt poly tool to fix any minor intersection issues. It worked great and I was able to do about 20 cloth sims in one night - on a laptop!"

www.syflex.biz

● Kory Juul used *SyFlex* to animate his short film *The Sandbox*. SyFlex 3.5 for Maya costs $2,200 and is reviewed in the next issue of *3D World*
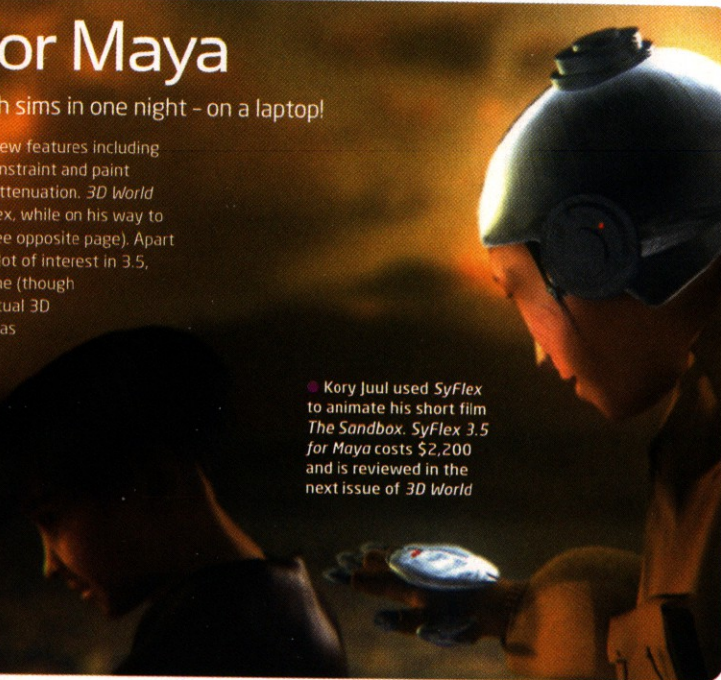
● The final shot, featuring Wallace and his Anti-Pesto bunny vacuuming device. "We had to be careful not to over-animate to the point of distraction," says Jason Wen

Wallace & Gromit

FILM FOCUS Our favourite clay double act is back in a big-budget caper set to send the fur flying. MPC's Jason Wen reveals what CG brought to Aardman's stop-motion epic **BY MARK RAMSHAW**
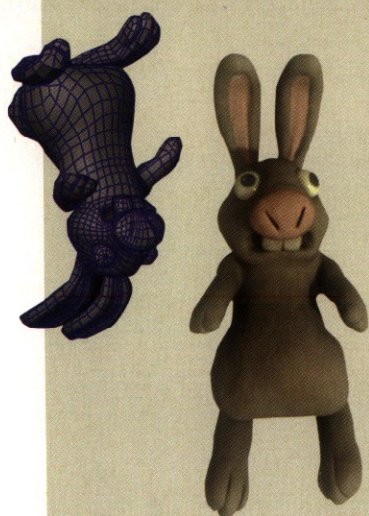
● "The bunny models are extremely simple, but there's just something so good about the Aardman style," says Jason Wen. "They're funny to look at even before they do anything, and once the mannerisms are added it takes it to another level!"

Disney may have turned its back on traditional animation techniques, but after the runaway success of *Chicken Run*, DreamWorks clearly has every faith in Aardman's hand-finished wares. *Wallace & Gromit: The Curse of the Were-Rabbit* is the latest from the Bristol-based studio – a lavish affair featuring the vocal talents of Ralph Fiennes, Helena Bonham Carter, Peter Kay and, of course, Peter Sallis as Wallace. It also marks the highly-anticipated big screen debut of the cheese-loving stars of the revered shorts *A Close Shave* and *The Wrong Trousers*.

While the movie storyline and visuals remain every bit as quirky as those stop-motion animated tales, not everything in this comically sinister tale could be brought to life with clay. Aardman brought the Moving Picture Company (MPC) on board to handle all the visual effects for the movie, which amounted to approximately 60 CG bunny shots and more than 700 compositing shots, including rig and wire removals and the addition of atmospheric elements. Furthermore, MPC undertook the digital intermediate work for the project. "Initially we were only going to work on the CG bunnies," explains MPC's Visual Effects Animator Jason

Wen. "But the workload eventually expanded to include explosions, fireworks, mud that spits out from under the wheels of Wallace and Gromit's car, some interactive 'mindwaves', CG fur for the were-rabbit transformation and also the movie titles."

Wen was one of a trio of full-time CG artists working on the project, with upwards of 15 compositors eventually brought in to deal with the increased shot count. "It was a real challenge to match our work up to Aardman's," notes Wen. "I got to spend a week over at their studio with Nick Park, Steve Box and the animation team, watching the production and getting a stronger idea of the kind of movements they were after."

The key work completed by MPC involved the CG rabbits. Although little direct animation reference was available beyond a couple of early tests, Wen says close contact with the directors provided strong guidance. When it came to building the initial CG bunny model, Aardman also provided a physical model for scanning.

"We used [the model] to build a clean mesh. It's not really the most complex of models, and the rig was also very simple." A few morph targets gave control over each rabbit's facial expressions. "The bunny might go from a standard face to

> ## "IT'S NOT ABOUT MAKING CG LOOK LIKE BAD ANIMATION. IT'S MORE THAT STOP MOTION IS A DIFFERENT STYLE."
> **JASON WEN, VISUAL EFFECTS ANIMATOR, MPC**

A happy Wallace, despite the cheese still tasting like Plasticine
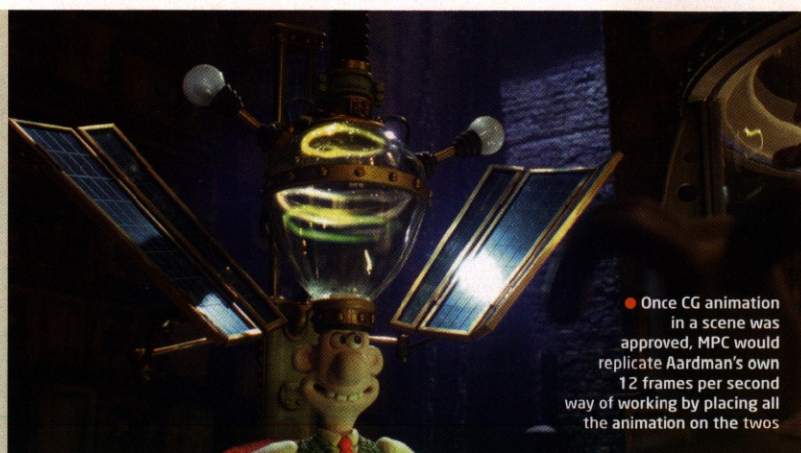
Once CG animation in a scene was approved, MPC would replicate Aardman's own 12 frames per second way of working by placing all the animation on the twos

an open mouth in just two frames or so," says Wen. "It's not a matter of making it look like bad animation, more that stop-motion is a different style. People tend to think of it as simple, but it's more focused on setting up nice-looking poses and getting the time of each movement just right."

DIGITAL HANDICRAFT

To create CG bunnies that would be indistinguishable from their clay counterparts, MPC needed to simulate the effect of hand on clay. "If you look at Aardman's animation, you'll see a ripple, with bumps and impressions appearing when an element such as an arm is adjusted," says Wen. "Our system enabled us to apply procedural displacements localised to the correct area, with the amount of displacement dependent on how much shifting of the geometry was going on."

Simulating the lighting characteristics of clay characters proved somewhat easier. "Clay is a thick, dense material, so there's no need for anything fancy such as translucency, subsurface scattering or reflections – except on the eyeballs," explains Wen. "We got the first couple of shots to match and made a basic light rig that we could import and juggle around. We also output a lot of data to the compositors, so they could use *Shake* to adjust colour, shadowing and the lighting."

It's not only movie audiences who may have trouble distinguishing the work of MPC from Aardman's. "There's one sequence in Wallace's cellar for which they actually shot the first still plate with clay bunnies visible in the bottom of the container. When some of the guys at Aardman saw the scene, they thought it was clay animated from start to finish."
www.wandg.com

WALLACE & GROMIT | The Curse Of The CG?

Is the use of digital trickery in Aardman's new movie an indicator that the end is nigh for stop-motion animation? Moving Picture Company's Jason Wen thinks not.

"The thing to remember is that our 35 CG bunny shots represent a small part of the movie," he says. "To do those scenes with stop-motion would have required the whole shooting schedule to work on it! They did initially try to do it by hand, but realised that putting upwards of 30 bunnies floating in a container would have required too many rigs, and required too much clean-up to deal with multiple passes and rigs obscuring the action.

"Digital rig removals simply give them a lot more freedom to be extreme with the movement of the characters. The animation itself is still all Aardman's."

There's still a spring in the step of stop-motion animation, despite the influx of CG trickery

In addition to the CG bunny work, MPC also contributed digital fog, fireworks and 'mindwave' effects and CG fur. MPC used its own *Delilah* system to create the latter element, as *Maya* fur just didn't offer enough control

The foreground elements in this shot from *Wallace & Gromit: The Curse of the Were-Rabbit* is all the work of Aardman, with a sky replacement, featuring fireworks, created at MPC

Shop 'til you drop

Studios that don't leverage overseas talent are at a huge competitive disadvantage, analysts claim. But how much does outsourcing cost?

Outsourcing is usually referred to with all the same negative connotations of 'runaway production'. But offshore outsourcing is rapidly growing and is predicted to be a $10 billion market by the end of the year. Companies specialising in graphics and animation are playing their part and establishing themselves in every corner of the world.

The demand for faster development and product turnaround times makes offshore development an attractive cost-saving measure. However, Senior Producer Adam Parsons at Codemasters, who has been responsible for successfully outsourcing artwork and code for the past four years, says: "One of the biggest myths of outsourcing is that you can make massive savings. Naïvely, companies outsourcing for the first time often don't realise they need a dedicated internal management structure for quality assurance and managing the contractual and production side of the work."

Outsourcing work can also provide the convenience of having staff ready to work on a project, instead of ramping up and then having staff sit around until the next project begins. "It's hard to judge but I'd estimate there is a saving," says Parsons. "Maybe 25 per cent per project, if it's done right and in a country where the dollar is strong."

Animation Series Producer Bill Schultz at Mike Young Productions, a company currently working with India-based Crest Animation Studios, adds that strong relationships are key: "People shouldn't rely on contracts, budgets, schedules, pipelines and all of these great buzzwords. Don't get me wrong, they're all important, but the number one factor in all of this is trust."

Netherlands

SERVICE
Partner studio for film, TV and next-gen games development

ESTIMATED COST COMPARISON
Less expensive than the UK. On a par with the US

PRODUCTION SAVINGS
Competitive

CONTACT
Streamline Studios, Purmerend
www.streamline-studios.com

CLIENTS
EA, Codemasters, Ubisoft, Epic Games, Red Storm Entertainment, Gearbox Software, Atari, Human Head Studios, Khaeon, Playlogic Entertainment

RECENT PROJECTS
CG cinematics and TV commercial for *Tom Clancy's Ghost Recon 2*; four next-gen projects; development of a CG TV series and film project

WHY SHOP THERE?
Pros: Established next-gen pipeline; a 40-processor renderfarm available for hire; facility operates in English; bohemian spirit
Cons: Not the cheapest

INDIA

SERVICE
Computer animated TV series

ESTIMATED COST COMPARISON
Average project cost - $250 a day in India compared to $500 a day in the US

PRODUCTION SAVINGS
30-50%

CONTACT
Crest Animation Studios, Mumbai
www.crestindia.com

CLIENTS
Blitz Games, Mike Young Productions, Nelvana, Lions Gate Entertainment

RECENT PROJECTS
Pet Alien; *Jakers! The Adventures of Piggley Winks*; *Dive! Olly! Dive!*

WHY SHOP THERE?
Pros: Animation production costs in India are several times lower than rates in other major centres
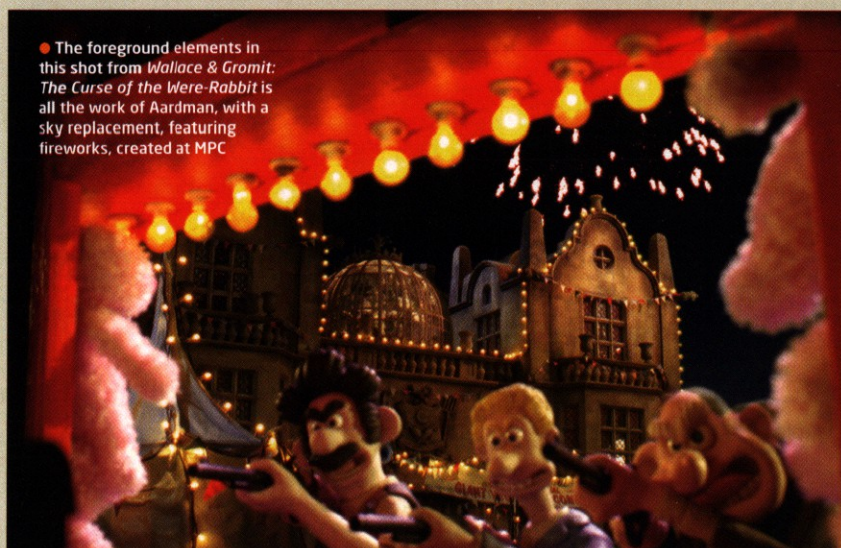Cons: Costs rising as the industry becomes more established; cheap competition in other territories

VIETNAM

SERVICE
Assets creation for the games industry

ESTIMATED COST COMPARISON
$5,000-$20,000 average annual salary (10-20 times less than in the US)

PRODUCTION SAVINGS
Approximately 50%

CONTACT
Glass Egg Digital Media, Ho Chi Minh City
www.glassegg.com

CLIENTS
Microsoft, Electronic Arts, Midway, Codemasters, Kuju, Atari

RECENT PROJECTS
Forza Motorsport (Microsoft); *LA Rush* (Midway); *TOCA Race Driver 3* (Codemasters)

WHY SHOP THERE?
Pros: Low production costs; large and skilled labour pool; extremely low labour costs
Cons: International phone calls are incredibly expensive

RUSSIA

SERVICE
Games development for PC, mobiles and consoles

ESTIMATED COST COMPARISON
Projects cost 2-3 times less than in the UK or US

PRODUCTION SAVINGS
Over 50%

CONTACT
Nival Interactive, Moscow www.nival.com

CLIENTS
Codemasters, Empire, JoWooD, Ubisoft, Wanadoo, GameOver Games, CDV

RECENT PROJECTS
Heroes of Might and Magic V; *Blitzkrieg II*; *Night Watch*; *Ex Machina*; *Hammer & Sickle*; *Silent Storm*; next-gen projects

WHY SHOP THERE?
Pros: High quality; low production costs; skilled workers; large teams for major projects; competitive for next-gen console games development
Cons: Language barrier may be an issue (although Nival Interactive also has offices in Florida, US)

AUSTRALIA

SERVICE
Programming, 3D engines and plug-ins, and graphics development work

ESTIMATED COST COMPARISON
Competitive

PRODUCTION SAVINGS
Time, labour and headaches rather than financial savings

CONTACT
Bytegeist Software, Sydney
www.bytegeistsoftware.com

CLIENTS
Right Hemisphere, Microsoft, Codemasters, smartVR, Plastic Wax, 3D Interactive, Brilliant Digital Entertainment

RECENT PROJECTS
3D engines and optimisations; 3D plug-ins & exporters; ActiveX technology; middleware implementation; GUIs; the brains behind the Xbox Preview Pipeline, Bytegeist Mocap Data Module for Deep Exploration, plus Ghost Trails and Snap2Terrain

WHY SHOP THERE?
Pros: Experienced developers; thorough understanding of project management; no language barrier; latest tools for easy communication
Cons: Similar costs; time difference

US box office revenue has risen every year since 1991. This is quite a feat, and it would be very optimistic to believe that this trend could continue forever – which, of course, it hasn't. This year is the first time it's actually dropped. The year isn't over, but as I write this, we're down about nine per cent over the same period in 2004.

There's been a lot of noise about the possible reasons: suggested culprits include high ticket prices, expensive food, commercials in the cinema (something that's new to American screens), and noisy patrons. Oh, and maybe the movies suck.

The movies have been particularly dire this year. Even supposed 'sure things' like *Stealth* and the follow-up to *XXX* did very poor business. The CG features continue to deliver solid stories and great visuals: we're looking forward to Disney's *Chicken Little* and the non-CG *Wallace and Gromit*, but the rest of the films have seemed a little tired.

The studios don't want to hear this. To them, this is a piracy issue. They point out that tickets got more expensive last year, people were also noisily using their mobiles in the cinema during previous years, and while nobody loves commercials, they didn't just show up in 2005, either. So, the problem is clear: people are pirating movies. And what's the answer to this problem? Why, it's to remove the gap between cinema release and DVD release.

Straight to DVD

Craig Zerouni Box office sales are down, probably due to piracy and affordable plasma screens. Have cinema releases just become marketing exercises for the soon-to-follow DVD?

If a film were available in all media at the same time, then the opportunity – and the desire – to steal films would be reduced.

There are some obvious problems with this logic, such as the fact that films are already available illegally almost before they're released, but it's also true that cinematic film release is becoming less important. In fact, it's really become a kind of advertising campaign for the DVD release, which is partly why the DVD release dates have been getting closer to the cinema ones. Why waste all that buzz?

The gap between cinema and DVD release has gone from about six and a half months in 1994 to four and a half last year. And when Robert Iger, Disney's CEO, said recently that maybe they should just release them at the same time, theatre owners went nuts. The response from the National Association of Theatre Owners was this: "[Iger] knows there would be no viable movie theatre industry in that new world."

But that industry may be dying. The one thing that is actually new, compared to 1991 or even to 2001, is affordable, large, high-definition screens. The screens at many multiplexes are pointlessly small, and for vast chunks of the market, a large plasma screen is plenty good enough. People are building their own home theatres and this is what's draining the cinemas.

Not that film projection will go away. There will always be a market for properly projected film on a large screen as a shared experience, but it's going to become less common. Ray Feeney, a pioneer in the Hollywood CG community, used to say that going to a film screening will become like a night at the opera – expensive, rare, and requiring a dinner jacket. Well, I suspect the formal wear will still be optional, but the rest sounds about right.

Projects round-up

Where else would you find Nine Inch Nails, spreadable butter and Mr Cowell?

01 IPN POKER ADS

Addiction created two ads for the International Poker Network to draw attention to ipnpoker.net. "The animation was done using hinged movements and cell frames," says director Ryan Brotherston. "Our camera moves were plotted in *Cinema 4D*, and then, while rendering the movie of the 3D model, we could export the camera moves into *After Effects* and use our scene elements in 3D space built around it. The challenge was to composite the 3D models' movement with the 2D elements to plot smooth camera moves that are seamless in *After Effects* and *Cinema 4D*."
www.addiction.tv

02 THE X FACTOR PROMO

To lead ITV viewers into the current series of *The X Factor*, The Hive produced a "long, dark and ominous CG corridor." According to Creative Director Phil Hurrell, "the toughest part was the lighting. We used *Mental Ray's Final Gathering* plug-in, which causes light to behave as it would in real life - it interacts with all elements in a scene, which was perfect. Animator Howard Bell built the corridor in *XSI* - the floor, walls, ceilings and air-con units. We purposely built elements that reflected the light well. We also used lots of textures in the corridor to ensure realism."
www.vtr.co.uk

03 DAIRY CREST COMMERCIAL

Cityside is the latest ad for Country Life butter, with creature animation courtesy of Framestore CFC. Technical Director Jake Mengers explains: "The creatures were produced in *Maya*. One virtuoso element the 3D team created was a rim-light pass for the pan along the window, with delicate translucency added to the squirrel tail edges and creatures' ears - it sells it." *Inferno* artist Ben Cronin placed the 3D animations into the shots: "My favourite shot is of the hedgehogs. They're so beautifully rendered, I was convinced they were real, and I comped it!"
www.framestore-cfc.com

04 NINE INCH NAILS VIDEO

The video for *Only*, in which a pin block takes on the shape of Trent Reznor's face, is a collaboration between director David Fincher and Digital Domain. Eric Barba, VFX Supervisor, explains: "We used a robot camera to take pictures in every direction and assembled them to create a 3D space. Digital shots of the objects were used as references for modelling, skinning and texturing. *LightWave 3D* was used for pre-viz and R&D, *3ds Max* for driving the pins through a custom script, *V-Ray* for rendering, and *Maya* for the Newton's Cradle animation."
www.digitaldomain.com

05 SICAF TITLE SEQUENCE

Inspired by the mushroom dance from *Fantasia*, Studio aka's Marc Craste produced the title sequence for the Seoul International Cartoon and Animation Festival. "It was created in *Softimage XSI* and rendered using *Mental Ray's Final Gathering*. To achieve the surface flickering of the characters, Andy Staveley employed an unusual render process using a degenerative render setting that was unable to lock itself. The pops and jumps were just the disturbed surface textures I was looking for!"
www.studioaka.co.uk

01

02
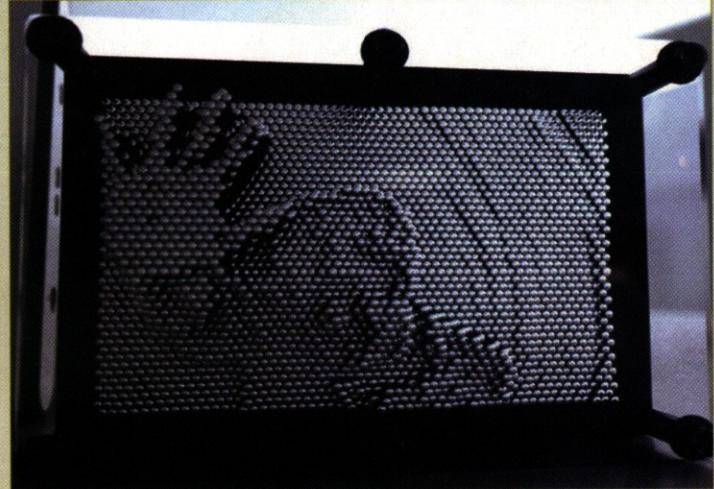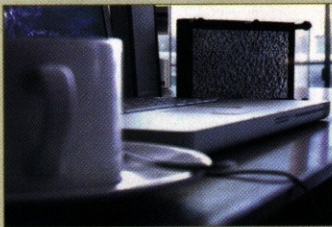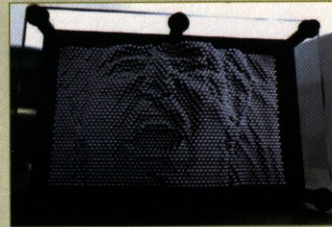
CAT2 plug-in for Max

SOFTWARE Developer claims a huge jump forward from its CAT predecessor

Character Animation Technologies has released the latest version of its *Character Animation Toolkit*, the *CAT2* plug-in, for 3D animators using *Autodesk 3ds Max*. The developer claims that *CAT2* is a huge jump forward from its predecessor, as well as a major advance compared to other existing systems.

Enhancements include a new rig manipulation system that enables you to 'push' the character into the required pose; a new foot pivot system so you can easily position, rotate and animate the foot in the viewport; and a stretchy bones mode that enables you to squash and stretch, also directly in the viewport. Time Warp curves mean animators can control the velocity of a whole animation layer with a single spline curve, making *Matrix*-like bullet-time effects straightforward. Also, *CAT* bones can now be moved, rotated and scaled by using Max PRS controllers on every bone.

Phil Shenk, Art Director of Flagship Studios, said: "[The CAT team] is dedicated to making software that animators actually like to use, and that meets the needs of today's production pipelines. Using *CAT* on [PC game] *Hellgate: London* has made a huge difference in the work we've been able to do, and the time it takes to do it." *CAT2* costs $995, while current *CAT* users can upgrade for the reduced price of $295. Educational pricing is also available.

www.catoolkit.com

● The *CAT2* plug-in for *3ds Max* promises an easy-to-use system that will enable animators to get more realistic motion from their characters

PLUGGED IN

CLAYTOOLS 1

Following releases for *3ds Max* and *Rhino*, Sensable Technologies has released *ClayTools 1* for Maya, delivering unconstrained organic modelling, fast texture baking and extensibility with MEL. The HapticExtender/MY plug-in and the Phantom Omni device enable users to interact with their 3D scenes and use their sense of touch to model virtual clay. *ClayTools 1* supports *Maya 6.5* and above, and it costs €2,795/$2,795.
www.sensable.com

EA'S MOCAP MARVEL

HARDWARE State-of-the-art motion capture stage for EA

ELECTRONIC ARTS HAS invested in an 86-camera Vicon MX 40 motion capture system for the state-of-the-art mocap stage at its new studio in Vancouver, Canada.

The new Vicon MX 40 rig will provide a greater level of capture detail, together with simultaneous full body and facial capture from a single or multiple actor performance. This will be used for games production on current and forthcoming consoles, including Xbox 360 and PlayStation 3.

Vicon's MX real-time optical motion capture systems feature ultra-high-resolution, true greyscale processing and virtually artifact-free capture with the Vicon MX 40, which Vicon claims to be the world's first four-million-pixel greyscale motion capture camera. EA has been employing mocap techniques as part of its games development pipeline for over 10 years.

After evaluating different motion capture solutions on which to base the company's future motion capture workflow, EA selected the VICON MX 40 for its high-resolution capability, automatable post-production toolset and the resulting ability to produce immense volumes of high-fidelity data quickly and efficiently.

www.vicon.com

● Expect even more lifelike gaming thanks to Vicon's mocap system

Shade 8 released

SOFTWARE e frontier packs in a host of new features

Shade 8 is the latest 3D modelling and rendering software release from e frontier. Aimed at architects, product designers and character modellers, it integrates with *Poser*, *ArchiCAD*, Adobe *Illustrator* and *Photoshop*, as well as other 2D, 3D and CAD applications.

New features in *Shade 8* include network rendering (via ShadeGrid) and stronger Boolean and Bezier modelling tools, in addition to new polygon mesh editing and auto-smoothing of curves. *Shade 8* also ensures better integration with *Poser*, and includes a new *Toon* renderer, faster radiosity calculation and an improved *Callisto* renderer with global illumination.

Shade 8 artist and beta tester Jürgen Schulz, who won the German Animago Award with a *Shade* illustration, said: "Without *Shade*, images would be impossible to realise in such a short time. The program is rich in features and easy to use to make realistic images."

e frontier claims that *Shade* already has over 70 per cent of the market share in the character modelling, product design and architectural design markets in Japan, which is the software's market-leading territory.

Shade 8 costs $200 for the standard version and $900 for the fully-featured professional version.
www.e-frontier.com/go/shade

● Artist Jürgen Schulz of Formmad Graphic created this wheel in Shade

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Sheryl Crow 'Good Is Good'

Psyop matches the latest tune from singer/songwriter Crow with a slow cruise through a CG world of blooming flowers, swaying branches and hand-crafted beauty BY MARK RAMSHAW

New York's Psyop studio has built itself an enviable reputation for lovingly crafted, often painterly animations. The latest client to approach the studio in search of 3D gold is Interscope Records, home to the multi-million selling Sheryl Crow. In addition to providing graphics for her new album and upcoming stage show, Psyop also put together a suitably beautiful and languid promo for her new single *Good Is Good*.

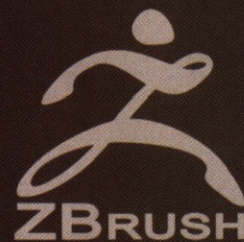"We were lucky in that they already liked the studio's work and there was no agency involved, so we really had creative free reign," says Domel Libid, Technical Director on the project. "It meant we were able to have a lot of fun pushing the boundaries."

In-house directors and designers Todd Mueller and Kylie Matulick supervised the project. "The way it tends to work here is that the designers brainstorm and come up with style frames," explains Libid. "These are still shots, usually put together in *Photoshop*, that determine the visual style for the project. The main thing is to make sure that whatever's depicted in the style frames are achievable in 3D in the given time frame."

Once the first of these frames was developed and approved, a live shoot was scheduled and work continued on further style frames with at least one for each of the promo's 11 'worlds'. Similar natural elements feature throughout, which made it possible to put together a library of about 50 common 3D models. "We would then customise each as necessary for each scene, such as ones where a cloud has a reflection in the water, or another where they needed to drift apart."

Once the footage of Crow performing against greenscreen had been shot, this went to Psyop's tracking team. Particular attention was paid when selecting start frames, so that the singer's mouth movements perfectly matched the audio track. "We also kept the plates large, so that we could put her live image onto a grid, save it in *Flame*, and then move around or zoom if we needed to," says Libid.

He says the promo's organic style is something that comes naturally to Psyop: "The animation is a big part of it, with lots of dynamics, particles and volume lights. The light shards really help convey the depth."

Parallax plays a big part in the flow of the promo. With each layer often requiring different texture data, it made sense to render them out separately, with up to 40 passes for some scenes. "Of course, it meant that we could adjust individual layers without having to render absolutely everything out again," says Libid. "The whole process of using the translation and rotation camera information to work directly in *Flame* also alleviated a lot of things. And we even did the dailies in *Flame* rather than at our own computers."

CAMERA SHARING

Flame artist Eben Mears says it's the unusual use of the compositing application that really gives Psyop an edge. "Our big trick is the way we share cameras between *XSI* and *Flame*, rebuilding the textures that come out of the 3D stage. We had issues with the crispness of the texturing that was coming out of *Mental Ray*. It looked too soft. The animation and 3D elements are all done in *XSI*, then the textures are applied in *Flame* by creating matte cutouts and filling in the spaces."

The studio uses a custom script to export the raw data from *XSI* to *Flame*. "All the elements are in 3D space, but the textures being applied are flat," Mears explains. "It's about projecting textures to create a multi-plane look, rather than doing 3D texturing onto geometry with *Flame*."

Mears says it ultimately became necessary for team members to stay overnight, babysitting the renders on the *Flame* boxes. "But doing it this way enables us to achieve the exact look the directors want, interactively working with the scene in a way you can't with a 3D package. We can tweak anything at any particular moment. And if there's one thing the directors here like to do, it's tweak every single pixel of every frame until it looks absolutely perfect."

Sheryl Crow's new single, *Good Is Good*, is out now on Interscope Records. The video can be viewed at the Psyop website: www.psyop.tv

DETAILS

TITLE
Sheryl Crow
Good Is Good

AGENCY
Interscope/A&M Records

PRODUCTION, DESIGN AND ANIMATION
Psyop

DIRECTORS
Kylie Matulick and Todd Mueller

RUNNING TIME
4 minutes 30 seconds

FIRST BROADCAST
August 2005

URL
www.psyop.tv

TEAM SIZE
Up to 18 (15 in 3D)

TIME TAKEN
Two and a half months

SOFTWARE USED
XSI, Mental Ray, boujou, Shake, Flame

FREEZE FRAME

Swirls of light spin through the darkness as a slide guitar kicks in and the camera begins a slow pan across a world of watercolour textures and graphic shapes. In among monochrome trees, sprouting flowers and heavily defined cloud shapes stands Sheryl Crow. The camera continues panning, the singer periodically reappearing in frame. As the song progresses, we see a variety of subtly different world themes. Some are bathed in daylight, others are night-time scenes lit by shards of ivory white light. Some are filled with rain, some with swans flying across the screen, and all are beautifully painted and rendered. As the song reaches its conclusion, the scene slowly fades to inky black.

IN FOCUS | How Psyop went about constructing no less than 11 organic 'worlds'

01 The live shoot took place while the design phase was still underway, with the 3D animation then built around the footage. Tracking was done in *boujou*. "We try to do things on the fly, making it more of a creative process," says TD Domel Libid.

02 "One animator handled everything within each 'world', and we worked on the transitions afterwards," says Libid. "Separating it this way meant one change within the four and a half minute promo didn't affect everybody in the pipeline."

03 *XSI's* dynamics are put to use animating elements such as the branches of the weeping willow tree, hanging vines and moving grass, while particles drive the animation of the pollen in the air and for the waterfall.
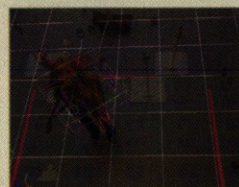
04 "We dissect every pixel of every frame to make it perfect," says Eben Mears. "Doing that with a four and a half minute promo was a challenge. I've also spent time in *Flame* working on techniques to get things looking more 'analogue'."

05 "A lot of the flower textures were created in *Photoshop*, but we also took elements from style frames and projected those into the scenes," says Libid. "The growth of the plants was then handled by spine deformations."

06 "Some scenes have more than 150 flowers on screen, so we did a lot of videogame-style texture tricks," says Libid. "Our guys also wrote scripts to help us with flower placement, as it would have taken days to do by hand."

EVENT HORIZON

**FLIP ANIMATION FESTIVAL
27-29 OCT, WOLVERHAMPTION**
The West Midlands-based animation showcase is now into its second year and includes panel discussions such as 'New Directions for Animators', as well as workshops, talks, screenings and awards.
www.plotonline.co.uk/events.asp

**ARTFUTURA 2005
27-30 OCT, BARCELONA, SPAIN**
This digital arts and new media festival covers multimedia design, electronic art, digital cinema, 3D animation and games. VFX Supervisor Pablo Helman from ILM is among the guest speakers at the show.
www.artfutura.org

**VIRTUALITY
3-6 NOVEMBER, TURIN, ITALY**
Computer graphics, digital cinema, virtual reality, 3D animation and visual effects are up for discussion at Virtuality. There's also the worldwide student competition for digital shorts using animation or special effects.
www.virtualityconference.it

**BRADFORD ANIMATION FESTIVAL
16-19 NOVEMBER, BRADFORD**
BAF's competition and awards celebrate the world's best new animation. The festival's rapid growth means it's establishing itself as a key event on the European festival circuit.
www.baf.org.uk

Virtual Rome Project

HARDWARE Animazoo kits out Roman gladiators so they can battle it out in a motion-capture first

Animazoo, the manufacturer of the Gypsy motion capture system, has stepped back in time to capture sword-wielding gladiators for a 3D stereoscopic and fully immersive show called the Virtual Rome Project.

In conjunction with Past Perfect Productions, the University of Salerno, VR specialist Fakespace Systems and with performances by gladiators from Rome's Gladiator School, the completed concept enables visitors to witness the rowdy, thronging crowds and amazing spectacle of the Colosseum – albeit virtually.

The showpiece fight sequence was captured using two GypsyGyro-18 motion capture systems and it was shot over an area the size of a basketball court. The action was recorded in a single continuous three-minute take, which Animazoo claims is a first for motion-capture technology.

Eighteen small inertial gyros (or sensors) were fitted to the suits worn by the gladiators, allowing precision and stability of motion data. All data was processed on the suits and transmitted to radio receivers, where it was then recorded onto two laptops using Gypsy's advanced software.

"The gladiator sequence was very complex, with a lot of movement – it was a very aggressive fight," said Joel Myers, CEO of Past Perfect Productions. "But the system held up impressively well amid the action sequences."

The gladiators used properly weighted weapons and props, and were unrestricted in their physical movements, enabling anything from full contact to rolling around in the wide capture area. And because the Gypsy system measures and records rotations of body parts, there was no risk of occlusions or marker swapping , which can occur with some optical mocap systems.

Data clean-up was also massively reduced. "On a shoot like this, where there's such a lot of high energy, falling about and banging around, we had to take the data into Alias *MotionBuilder*," explained Animazoo's Sam Berey. "We did route translation work, using just one point on our system. However, with traditional optical systems, you often have to look at 40 separate markers and work with any occlusions or data cleaning on each separate marker."

For a real sense of history, and reflecting the depth of research by the University of Salerno, the gladiator models that were recreated by Past Perfect Productions were based on actual skulls, DNA samples and skeletal remains of exhumed gladiators discovered in Pompeii.

A 'prelude' to the show, called Building Virtual Rome, is on display this autumn, while the fully immersive Virtual Rome Project will be open to the public from next year. It will be based at the Colosseum in Rome.
www.animazoo.co.uk
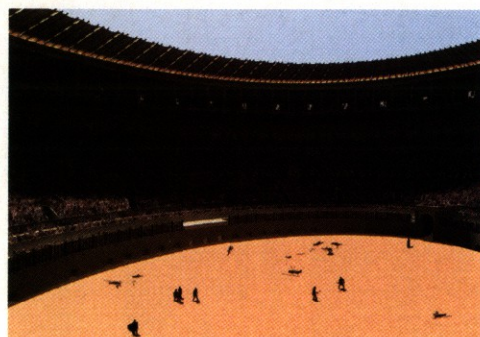
● **Make your Russell Crowe fantasies – no, not those ones – come true by experiencing Rome's fully immersive, virtual Colosseum**

Production line
The month's other releases in brief

VUE 5 EASEL
E-on software, developer of environment-creation software, has unveiled *Vue 5 Easel*. The new entry-level app provides a simple introduction to 3D by using presets, yet includes advanced features such as global illumination. It costs $99 for Mac or PC.
www.e-onsoftware.com

FINALRENDER
New upgrades from Cebas include *finalRender Stage-1 Release 2*, which has a new fourth-generation GI engine for top performance and stability. Also, *finalRender Stage-2 for Maya* and *Cinema 4D* deliver a robust global illumination engine and a flexible shader tree.
www.cebas.com

PARTICLEILLUSION
Particle effects creation tool *particleIllusion 3* is now shipping for Mac OS. As well as creating fantastic explosions, *particleIllusion 3* enables you to quickly and easily add a whole range of particle effects to images and animations. The software costs $389.
www.wondertouch.com

FACIAL STUDIO 1.5
Di-O-Matic has released *Facial Studio for Windows 1.5*. The facial modelling and animation software has 500 facial controls and new features to enable users to quickly create heads based on photos. *Facial Studio for Windows 1.5* costs $699.
www.di-o-matic.com

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MeNTaL RoY

Mental Roy always thought the word 'festival' implied some sort of fun, until he discovered the kind of films CG festivals think are the pinnacle of the medium

SINCE YOU ASKED, I'll tell you about one of my favourite CG films of all time: *The Deadline*, a film made at Aardman in 2002 by Stefan Marjoram, Dan Lane and Wee Brian (who may or may not be so wee any more). It's about three animators who can't think of anything to put in their film, and tell you as much. That's about it, apart from a song about a bee at the end. It's short, funny, original and voiced by the animators themselves.
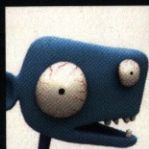
The Deadline doesn't look like CG at all. There are no special effects. There's no subtext. It doesn't examine the human condition. Yet, in two minutes, it creates an entire world of its own IN ONE LOCATION, introduces three instantly recognisable characters, gives you an excellent payoff and leaves you wanting more. Now that, my friends, is what you call a fine film, CG or otherwise.

In short, it's exactly the sort of thing that animation festival judges would loathe, because apparently nearly all festivals are seemingly desperate to promote CG as a SERIOUS ART FORM. See, they seem to say, not for us the vapid thrills of your Saturday morning cartoons. No, we're far beyond mere 'entertainment' and 'plot'. Please take us seriously, go on.

Heed the festivals' earnest cry: These are genuine artists with genuine issues! They're probably racked with despair and self-doubt at this very moment, expressing their agonies and fears in a complex, nonlinear, multi-layered fashion that will challenge your very perceptions of the world. With NURBS.

So, here's my guide to producing an almost guaranteed festival-winning film, for those who wish to be recognised as SERIOUS ARTISTS.

1. Dispense with plot. You could hint that your film is based on a famous short story, preferably a 19th century Russian one, but ensure that it bears absolutely no resemblance to it in reality. One good trick is to randomly shuffle the scenes around now and then.

2. No dialogue. Characters in a SERIOUS ART FORM don't actually speak, because they're too tortured by their own inner demons. If you must have some form of communication, stick to grunts, whistles or squeaks.

3. Character development: no no no. These are not characters, they're metaphors. There's no need for cause and effect.

4. Keep everything nice and dark. Ideally you would have no lighting at all, which would certainly make rendering a lot simpler, but if you really must, ensure that it's about the level of a 20W bulb.

5. Work on your film for at least four years. This, of course, marks you for the driven, dedicated, not to say obsessed ARTIST that you are, but it has another advantage. By the time you finally finish the damn thing, you'll have entirely forgotten what it was meant to be about in the first place and be as confused as everyone else. Always a plus point.

6. No happy ending. In fact, no ending at all if you can get away with it, but if not, chuck in some explicitly violent death scenes just before the final credits roll (silently, of course).

7. If you're not actually from Eastern Europe, adopt a suitable-sounding pseudonym. Judges love this.

Now go forth, SERIOUS ARTISTS, and start producing those achingly long, depressing, totally impenetrable masterpieces that will achieve you instant stardom. Or a festival prize, anyway. I've started mine already: it's called *Marfeck: DreaMs of DiSCord*. See you at Siggraph in 2012!

> **CHARACTER DEVELOPMENT: NO NO NO. THESE ARE NOT CHARACTERS, THEY ARE METAPHORS**

GLOBAL ILLUMINATION #07

Key stats and trends from the 3D industry in specific countries. This issue: **Germany**

The German animation industry has seen rapid growth in the last decade, with successful, locally developed feature films such as *Werner – Volles Roaaa!*, *Kleines Arschloch*, *Pippi Longstocking* and *The Little Polar Bear*. This growth is encouraged by the government, which bolsters the industry with flexible funding and infrastructure support.

German animation film studios collaborate a great deal, and they also work independently on the production of feature films. For example, four German animation studios collaborated on *The Little Polar Bear*.

The pan-European collaboration of studios is now a common trend, and this is particularly evident among German animation studios, which are preferred partners largely due to the encouraging German funding patterns and contract structures.

The leading animation studios in Germany are: Hahnfilm, Rothkirch/Cartoon-Film, Trickompany and Animationsstudio Ludewig, Animationsfabrik Hamburg, Motion Works, Trixter Film, Munich Animation Film, Senator Filmproduktion, Greenlight Media, Toons 'n' Tales, Scopas Medien and Studio Film Bilder.

These statistics were provided by Digital Vector, a research and consultancy firm providing reports on aspects of the global animation industry. Visit **www.digital-vector.com** to find out more.

- The German animation industry is geographically scattered around cities such as Berlin, Hamburg, Halle and Munich
- Germany is one of the top three animation markets in Europe, along with France and the UK
- The industry currently has the capacity to produce eight animated films a year in Germany
- On average, the German animation industry has been producing three animation films per year

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It provides the perfect platform on which to create ever more cinematic-looking games. But does that power come at a price? We asked 3D artists on the Xbox 360 launch titles how Microsoft's next-generation console has changed their working lives **BY JON JORDAN**

Each new wave of game consoles throws up contradictions. On the one hand, some developers treat their emergence as a threat to stability and, more importantly, profitability. On the other hand, they present opportunities for creating new experiences, as well as providing new shiny toys for everyone to play with. It's a schizophrenic situation of excitement shot through with fear that can bring out the best and the worst in the games industry.

When launching its Xbox 360 console, Microsoft adopted a somewhat surprising angle: "Welcome to the High-Definition era," said J Allard, the company's Corporate Vice President and

> *The biggest impact is the amount of time it takes to produce a single game asset. Everything is higher detail and higher quality* **NICK DIXON, DESIGN MANAGER, BLITZ GAMES**

Chief XNA Architect. Instead of talking up new games or new business opportunities (these were mentioned later, of course), his vision thing was literally a vision thing.

With Xbox 360, Microsoft is using all of the advantages of being the first company to launch a new console (Sony and

● Fantasy game *Ninety-nine Nights* shows the visual splendour expected from Xbox launch titles, with hundreds of characters and dazzling effects

● Built upon its extensive *Unreal Engine 3*, it's not hard to see why *Gears of War* is one of the most anticipated Xbox 360 titles

● Thanks to Xbox 360's full-screen filters, *Tom Clancy's Ghost Recon Advanced Warfighter* achieves a distinctive gritty, washed-out visual style

> *There's only a certain amount of detail that developers can afford to put in a game. Are you really going to see more sales by hiring another 10 artists to render the buttons on a character's shirt?*
>
> **WALTER LYNSDALE, TECHNICAL DIRECTOR, BIZARRE CREATIONS**

Nintendo rival consoles will follow in 2006), and is determined to look outside the box marked 'gaming' and try to integrate games within the wider visual cultures of movies and TV. Despite the increasingly prevalent 'supercomputer' nature of home consoles, the irony is that they're still being connected to standard interlaced TV sets, even as resolutions for PC gaming blaze past the 1,280-pixel barrier with 32-bit colour and full screen antialiasing.

Or, as Peter Moore, Microsoft's Corporate Vice President for Worldwide Xbox Marketing and Publishing puts it: "Every Xbox 360 game will be designed for High Definition widescreen television and will support 16x9 aspect ratio to expand the storytelling canvas. In addition, Xbox 360 games will provide antialiasing that gets rid of what we call 'the jaggies'. Well, you know what? With Xbox 360, the age of the jaggies is over, superseded by smooth, lifelike visuals of cinematic quality."

Hyperbole to be sure, but for developers working on forthcoming Xbox 360 games, there are some stark facts to deal with. For example, all 360 games have to run at a minimum resolution of 720 progressive scan to be finally accepted by the head honchos at Microsoft.

MORE DETAIL, MORE WINGNUTS

Going back to the induced schizophrenia, some developers are rejoicing: "A decent image on a large screen, at last! It's been a long time coming with home consoles," says PomPom's Michael Michael, the only full-time artist working on the downloadable retro game *Mutant Storm* for Xbox 360's Live Arcade service. "But for me, it's not so much about HD. The big plus is being able to work in 32-bit colour."

The effect on those studios who have always concentrated on console games is starkly different.

"Running at 1,280x720 – that's big," says Lee Musgrave, Director of Technical Art at Microsoft-owned UK studio Rare, previously best known for developing games for Nintendo consoles such as the N64, and the original Xbox. "It means our game assets have to have an exponential leap in quality. Everything from the game logo to the main character model is now at a level of fidelity that would have been unthinkable just five years ago. And the infrastructure needed to support this has to be suitably bigger, faster and slicker." It's these sort of knock-on effects that are forcing developers to rethink the process of making games and, in particular, the process of creating art assets for games.

"The biggest impact is the amount of time it takes to produce a single game asset," reckons Nick Dixon, Design Manager at independent UK studio Blitz Games. "Everything
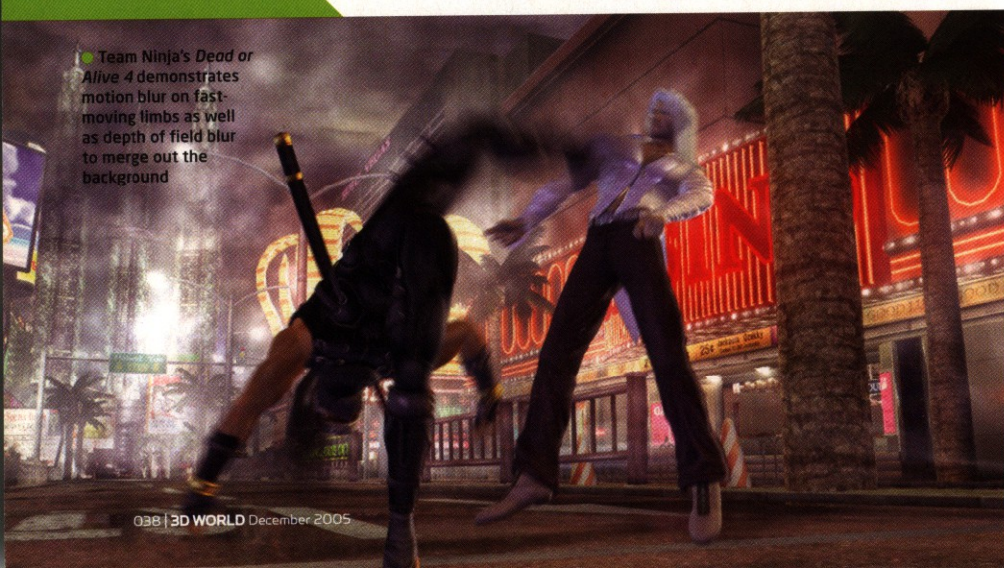
● Team Ninja's *Dead or Alive 4* demonstrates motion blur on fast-moving limbs as well as depth of field blur to merge out the background

● Not all Xbox 360 launch games are shot through with violence and heavy weaponry, as Rare's fantasy role-playing game *Kameo* ably demonstrates

● **Blitz** is ramping up its toolchain with software that can generate detailed Normal maps, such as Pixologic's *ZBrush*

● The streets of Blitz's *Possession* are inspired by a photographic style implemented via shaders, which add blur to non-realistic lighting models

FACTFILE

PROJECT
Possession

RELEASE DATE
TBC

DEVELOPER
Blitz Games

PUBLISHER
TBC

TEAM SIZE
40, plus core technology team

DEVELOPMENT TIME
18 months

SOFTWARE/TOOLS
• *Maya*
• *MotionBuilder*
• *ZBrush*
• *endorphin*
• In-house tools (*Fuse, Flare* and *Flame*)

LOOK OUT FOR
Sickly green tones of rotting flesh, high-energy collision animations, film-style filter effects and plenty of gore!

THE THIRD-PARTY DEVELOPER

CASE STUDY 1 Possession

Few Xbox 360 titles will be released solely for the console. For artists working on Blitz Games' zombie-fest, Possession, cross-platform compatibility is a key issue

Although the focus during Xbox 360's launch will be its own games, over its lifespan the majority of titles will be released on other platforms: PC, PlayStation 3 or Nintendo Revolution.

By definition, this adds complexity to the development process, as each typically has its own quirks. For Leamington Spa-based studio Blitz, the lead platform for its zombie game *Possession* may be Xbox 360, but with publishing rights still being negotiated, it's likely it will need to appear elsewhere, too.

According to Design Manager Nick Dixon, the trick around this is the studio's comprehensive in-house tools.

"We have an internal technology group who create our own middleware," he says. "However, it also allows us to fine-tune code and assets for each target platform."

For *Possession's* artists, the most important elements of this middleware is the *Flare* level-editing and lighting package and the *Flame* material editor. "Flare is the hub of our creative process," says Dixon. "It controls and manages all game assets, handles object placement and properties, as well as lighting using radiosity-based global illumination."

Flame is particularly important for Xbox 360 game development. "It allows us to create our own game-specific shaders," Dixon explains. "For each material, we have the ability to choose how many texture stages to use, the render states required and the shader routines to apply. The artist can see the

effects of their changes on the fly in the real-time model viewer."

But there's always a place for external tools and, most recently, Blitz has introduced NaturalMotion's *endorphin*. "It's an exciting tool because it allows us to set an external force to a character in real-time, so that it reacts in a realistic manner," he says. "For example, we've recently used it to crash cars into crowds of zombies, which then bounce off the bonnet and fly into the air. Instead of acting like limp rag dolls, they twist and turn naturally, preempting hitting the ground by pushing out their hands to protect themselves."

As befits a cross-platform studio, Dixon's conclusion on Xbox 360 is that it's just another console. "We've used multiple layered materials in pre-rendered scenes. All we're doing is using them real-time in a game engine."
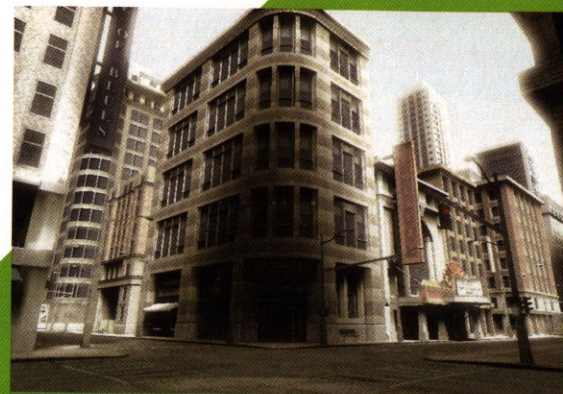
Q&A | Blitz Games

Q: WHAT'S THE BIGGEST CHANGE IN MOVING TO XBOX 360 DEVELOPMENT?
A: The biggest impact is the amount of time it takes to produce a single game asset, with everything being higher detail and higher quality.

Q: WHAT'S BEEN THE MAIN IMPACT OF GOING HIGH DEFINITION?
A: One of the benefits of next-gen consoles is the incredibly fast fill-rate speeds, which means there are no major issues rendering the number of pixels HDTV resolutions require.

Q: HAS IT CHANGED THE WAY YOUR ARTISTS WORK?
A: I don't feel the role of artists is any different. We're having to learn new techniques, to work with shaders and bring new tools into the pipeline, but this has always been the case.

Q: ARE ARTISTS HAVING TO BECOME MORE TECHNICAL?
A: Our artists have extensive skill sets, so they're becoming more specialised in key areas. We now have artists working solely on lighting, special effects or heads-up-display design.

Q: HOW HAS GOING 'NEXT-GEN' CHANGED THE SELECTION OF TOOLS YOU USE TO COMPLETE THE JOB?
A: *Maya* is still our main application, though we've felt the need to branch out in order to have the right tools for the job.
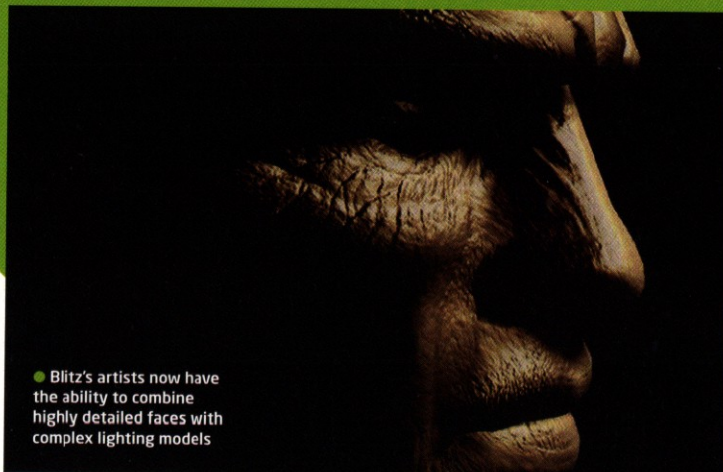
● Blitz's artists now have the ability to combine highly detailed faces with complex lighting models

● As you'd expect in a survival horror game such as *Resident Evil 5*, Xbox 360 allows for plenty of dark spaces and over-saturated natural lighting

● Originally planned for the forthcoming Nintendo Revolution console (2006), Joanna Dark's latest outing - *Perfect Dark Zero* - has become one of the highly anticipated flagship launch titles for Microsoft's Xbox 360

is higher detail, higher quality and makes use of multiple layered textures, normal maps and specular maps. We've spent a great deal of time getting our art pipelines streamlined to save wasted time and rework. This, of course, then needs to be documented so any new artist joining the team can get up to speed."

Another UK-based studio dealing with the same issues is Bizarre Creations. Already well versed with Microsoft hardware having released two versions of its *Project Gotham Racing* game, it's working on a third iteration for the Xbox 360 launch. It, too, has experienced a significant jump, affecting both quality and quantity, with the level of fidelity now such that artists are having to work at a microscopic level of modelling individual chassis wingnuts.

"In *Project Gotham Racing 2*, our cars consisted of 10,000 polygons, but now we're modelling the exterior with 40,000 and the interior with 40,000 polygons," reveals Design Manager Gareth Wilson. The rise in respect to level modelling has been even more stark. In the current New York level, the Brooklyn Bridge is modelled with one million polys, which is more than some entire levels in the previous game.

TRICKS OF THE TRADE

The problem, of course, is where to draw the line. Or, as Bizarre Creations' Technical Director Walter Lynsdale points out: "There's only a certain amount of detail that developers can afford to put in a game. Are you really going to see more sales by hiring another 10 artists to render the buttons on a character's shirt, for example? Production values will be a limiting factor."

But even for time-pressurised launch titles, the knock-on effects have been significant. As a minor example, Bizarre Creations spent £80,000 buying new servers to enable it to handle the assets required. More importantly for day-to-day operations has been the issue of how long it can take to export assets from modelling packages it uses into the game engine. In fact, such has been the knock-on effect of slow load times that for much of the production, there have been two versions of the game. One runs very slowly and is for artists and level designers to see the game running with all graphical modes switched on (also used for generating high-resolution screenshots), while the other runs at 30 frames per second thanks to untextured cars and
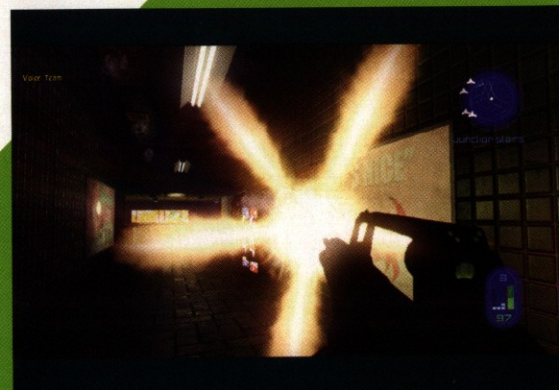
● Detailed surface materials combined with spectacular effects, such as this blooming muzzle flash, are just some of the impressive results of the extensive shader work that the Xbox 360 makes possible
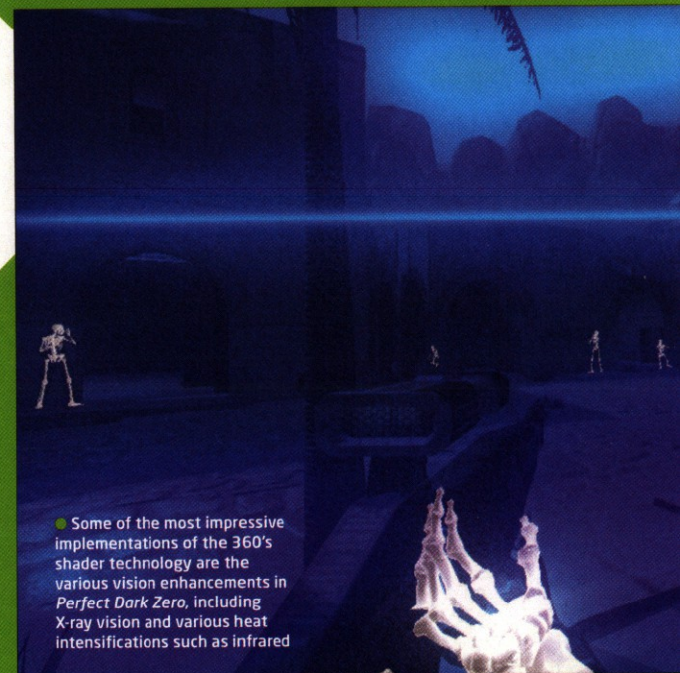
● Some of the most impressive implementations of the 360's shader technology are the various vision enhancements in *Perfect Dark Zero*, including X-ray vision and various heat intensifications such as infrared

THE FIRST-PARTY DEVELOPER

CASE STUDY 2 Perfect Dark Zero

Over four years in the making, Rare's female-fronted shooter makes use of the 360's full range of graphical capabilities, including Normal and parallax mapping

Even sticking to the proviso that all game projects are atypical, *Perfect Dark Zero's* development process has been convoluted. The sequel to Rare's *Perfect Dark* (2000), it's been caught out by corporate powerplays and technology shocks that mirror the travails of heroine Joanna Dark.

Not only has the ownership of Warwickshire-based developer Rare switched from secretive games giant Nintendo to expansive software giant Microsoft, but the target platform for the game has moved from the mid-90s architecture of the N64 console to its 2000-era GameCube, only to end up redesigned for the vastly different Xbox 360 following Microsoft's acquisition.

Over the last couple of years, Microsoft and Rare have combined to make *Perfect Dark Zero* the Flying Dutchman of UK game development: a ghost ship always on the move but with no destination in sight. This has all changed now. With *Halo 3's* release pushed to 2006, *Perfect Dark Zero* has become Microsoft's flagship shooter for the launch of the Xbox 360.

Nevertheless, it's been a frustrating process for those working on the game.

"There's not a single asset in *PDZ* that wasn't rebuilt when the team moved to Xbox 360 development," points out Lee Musgrave, Rare's Director of Technical Art. On a more positive note, it's a process that has provided the artists with plenty of opportunities to make sure their work is just right. Musgrave argues the power of the new console gives them much more freedom. "I think the art is more stylistic now," he says. "We have been freed to create characters and environments with real flair."

With freedom comes responsibility. In the case of *PDZ*, this boils down to the work of the concept artists who act as the visual guardians of the project.

"We have two concept artists who have forged the overall style," Musgrave says. "Everything from the game's front-end to the characters, environments, guns, vehicles, animations and explosions, is created with respect to the overall concept."

He also reckons the longevity of the project has created an implicit coherence: "The team's been living and breathing *PDZ* at an intense level for a long time," he says. "Even with a large team, it creates a level of instinctive knowledge of what the game should look like."

The growth of team size has been one of the more marked changes of Xbox 360 development. With a reputation for creating games with a small number of people, Rare has had to massively bulk up to handle next-gen. A large part of this inflation is due to the volume of assets required, and artists now have specialist roles, with shader creation being particularly crucial.

Other techniques, such as Normal maps, bump maps and virtual displacement maps (also called parallax maps), are supported by the game's engine and renderer and, within the wider memory constraints of the engine, artists have the ability to apply as many shader layers as they want to get the right visual effect.

Musgrave remains on the lookout for new tools that will ease the development burden – though the most important part of the toolchain is still the artists themselves. Pixologic's organic sculpting package *ZBrush* has been introduced to create cutting-edge

game characters. "We've also used it extensively for Normal map creation on our environments, and we have other tools that provide quick results for objects that the player won't ever get close to," he says. In contrast, additional detail mapping is added on top of the Normal maps where the player is able to get close to objects and scenery.

"This level of detail is one of the main reasons *PDZ* has required such a large team," Musgrave explains. "There's no way around the fact that the only way to author really great looking models is to work and work at them."

Yet, despite the challenges, the most surprising aspect of *PDZ's* development is how relatively straightforward it's been.

"I find it remarkable that we've come this far so quickly without the whole process collapsing around our ears," laughs Musgrave. "I guess that the best things are always built with a certain amount of blind ambition and healthy disrespect for adversity, right?"

Q&A | Rare

Q: WHAT'S THE BIGGEST CHANGE IN MOVING TO XBOX 360 DEVELOPMENT?
A: The lighting engine in *Perfect Dark Zero* is now pretty close to how an offline renderer works – which, in turn, is close to how real-world lighting works. The jump from last generation to next is immense.

Q: WHAT'S BEEN THE MAIN IMPACT OF GOING HIGH DEFINITION?
A: HD resolution involves 12 times more onscreen pixels than our N64 games, not to mention the similar leap in development hardware, storage space and general throughflow.

Q: HOW IS PERFECT DARK ZERO GOING TO LOOK DIFFERENT TO THE ORIGINAL?
A: The original game had a distinct style, but one that was determined by the polygon-pushing power of the hardware at the time. With Xbox 360, these constraints are gone.

Q: HOW HAVE TEAM SIZES CHANGED FOR XBOX 360?
A: Our N64 teams used to number about 15 people, whereas the *Perfect Dark Zero* team is the largest Rare has ever put together. The art team alone is bigger than an entire N64 team, so we've had to adjust our methods to accommodate this, which hasn't been a ride without bumps.

Q: HOW HAS IT CHANGED THE WAY YOUR ARTISTS WORK?
A: As the art team has grown, it's become less possible for artists to model, texture, light and shade a model from start to finish – something that's especially true considering *Perfect Dark Zero's* sprawling environments.

Q: ARE ARTISTS HAVING TO BECOME MORE TECHNICAL?
A: Some are, particularly those who are specialising in shader creation. They require a grasp of what goes into a shader, both artistically and technically. Having people in specialist roles is new for us, but it's something that's lifted the look of the game.

● Thanks to their vivid electrical style, many of the alien enemies in *Mutant Storm* make use of shader effects, with artist Michael Michael hoping to fully replace fixed textures with shaders

● First released for PC, the new *Mutant Storm* features higher resolution game objects, as well as a range of psychedelic post-processing effects

THE INDIE DEVELOPER

CASE STUDY 3 Mutant Storm

Available via Xbox Live Arcade, PomPom's retro shoot 'em up looks set to be the 360's most perfectly formed launch title, thanks in part to its shader effects

When a new console is launched, it's easy to get caught up in the razzamatazz of how it will revolutionise the way games are created. Yet, in the case of Xbox 360 at least, there's another side to the story. In contrast to the 100-strong teams seen elsewhere in the industry, there exists PomPom, a tiny London-based studio that comprises just two people: programmer Miles Visman and artist Michael Michael.

Their entry ticket to the Xbox 360 party is a colourful shoot 'em up called *Mutant Storm*. This isn't the sort of game you would expect to be fighting it out for gamers' attention with the likes of *Perfect Dark Zero*, and it won't. Instead, it demonstrates the disruptive forces at work in the games industry as graphical grunt slowly combines with broadband distribution. For *Mutant Storm* is the latest incarnation of that most retro of games types: Internet-distributed shareware.

Originally released as a downloadable PC game, eventually it found its way onto Microsoft's Xbox Live Arcade. This is the company's broadband service for both Xbox and Xbox 360, offering multiplayer gaming as well as the ability to download the first level of games for free (you subsequently pay a small fee to get access to the other levels). So successful did it prove to be, Microsoft asked PomPom to work up a new version for the Xbox 360 launch.

According to artist Michael Michael, the jump to 360 has been relatively painless, even for such a small team.

"It's a comfortable environment to work in," he explains. "From an artist's point of view, there are no real bottlenecks. The biggest problem is knowing when to stop putting in content! It's a bit of a beast, with a lot of possibilities."

Of course, it's the quality of graphics that people will be looking out for, and the ability to layer on shader effects is a major boon for a game with heavy psychedelic overtones. It's in this particular area where PomPom has had to expand its horizons.

"Getting to grips with pixel shaders hasn't been too difficult really," says Michael. "They're only as complex as the software controlling them. We've been evaluating RTzen's *RT/shader: Ginza*, which is a pretty good tool to start off with. So, even though I hadn't used shaders before, I had a far better understanding after a couple of weeks of using *Ginza*."

But not all of the Xbox 360's new graphical capabilities could be exploited in-house. "We've had another guy working on the post-processing effects, which are all a little too complicated for me," Michael adds. "So I guess we're no longer strictly a one-artist project."

Q&A | PomPom

Q: WHAT'S BEEN THE MAIN IMPACT OF GOING HIGH DEFINITION?
A: For us, it's not so much about High Definition, but rather the fact that we're now able to work in 32-bit colour. A decent image on a large screen - at last! It's been a long time coming with home consoles.

Q: HOW IS MUTANT STORM GOING TO LOOK DIFFERENT ON XBOX 360?
A: We've been able to have more objects onscreen, as well as using higher polygon models, shader materials and adding some post-processing.

Q: HOW HAVE TEAM SIZES CHANGED FOR DEVELOPING XBOX 360 GAMES?
A: It's still mainly the two of us, though we have someone on the art side handling the post-processing effects, as well as an external person doing the sound effects.

Q: HOW HAS GOING 'NEXT-GEN' CHANGED THE SELECTION OF TOOLS YOU USE TO COMPLETE THE JOB?
A: Generally, we use the same tools we've been using since day one: *3ds Max 3.1* with several scripts written for animation keyframing and model/level export. Also *Texture Maker* for textures. And we're in the process of evaluating RTzen's *RT/shader: Ginza* for shader authoring.

scenery, so testers can check game functionality. Of course, these are the sort of tricks developers have to employ when trying to get a game finished for the launch of a console when everything, even its final specification, is uncertain. Indeed, the first Xbox 360 production lines only started rolling in early September, marking the point at which the hardware design was finally pinned down and developers could get to work optimising their games, so they ended up with something as pretty as their screenshot 'slow' version and as responsive as their untextured 'fast' version.

As with all consoles, the bottom line of Xbox 360 is hardware. In terms of the processor power, it boasts IBM PowerPC architecture with three multi-threaded cores providing a total of six 3.2GHz threads. Its GPU is a 500MHz custom ATI graphic part with 10MB of embedded DRAM, while both GPU and CPU share the 512MB of unified GDDR3 RAM.

It's a powerful combination that takes the best of PC architecture, while leveraging the significant benefits that come from the design of a dedicated piece of consumer electronics. This generates a raw level of performance of around one teraflop, or a trillion floating point operations a second.

CINEMATIC GRAPHICS

Over 90 per cent of this power is concentrated in the area of graphics output, with the result that Xbox 360 has the ability to push 500 million triangles a second - about 10 times the polygon capacity of the original Xbox. But according to ATI's European Developer Relations Manager, Richard Huddy, it's the 48 billion shader operations a second that really demonstrate what it can do.

"You actually get somewhere between 20 and 40 times the power of the original Xbox," he says. "This means games will look dramatically more impressive."

Broadly defined as small pieces of code that run on the graphics card and define the surface attributes, such as lighting styles, reflection and shadowing of a rendered object (or even the filtering of an entire scene), the introduction of shaders is the really revolutionary aspect of the next-generation consoles such as Xbox 360. Although the original Xbox could handle some shaders, it did so in a restricted manner. Xbox 360 makes the world of games much more akin to the flexibility of special effects production for movies such as *Toy Story* and *Star Wars: Episode III - Revenge of the Sith*. And even if he hasn't drawn inspiration from those exact titles while working on zombie
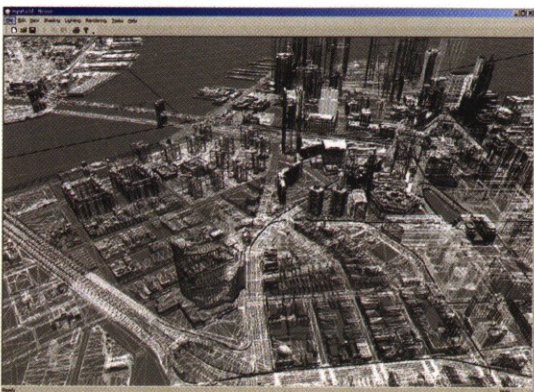
● One impact of Xbox 360 development has been the huge leap in asset density, which forced Bizarre Creations to spend £80,000 on new servers

game *Possession*, Blitz Games's Nick Dixon argues that shaders should make games look more like films.

"I've worked closely with our technical manager to produce a library of shaders and materials for our artists to use, and we've done a lot of research looking at films and photography to make sure our materials look real," he says.

In the case of games such as PomPom's *Mutant Storm*, which are graphically rich yet simple, shaders provide the opportunity to completely rethink the way a game is textured.

> *We now have artists who just work on shaders. Having people in such specialist roles is new for us, and they have a phenomenal grasp of what goes into a shader, both artistically and technically.*
> **LEE MUSGRAVE, DIRECTOR OF TECHNICAL ART, RARE**

"Now we're moving away from the standard approach of bitmap texture mapping and replacing them with shaders," says artist Michael Michael.

In the case of more traditional games, they provide a little extra eye candy that makes all the difference to the look and feel of the finished product. In *Perfect Dark Zero*, the carefully considered use of shaders has lifted the appearance of the game immensely, reckons Lee Musgrave. Although, as pieces of code that directly drive the visual style of a game, this has changed the structure of the game's art team. "We now have artists who just work on shaders," he says. "Having people in such specialist roles is quite new for us, and they have a phenomenal grasp of what goes into a shader, both artistically and technically."
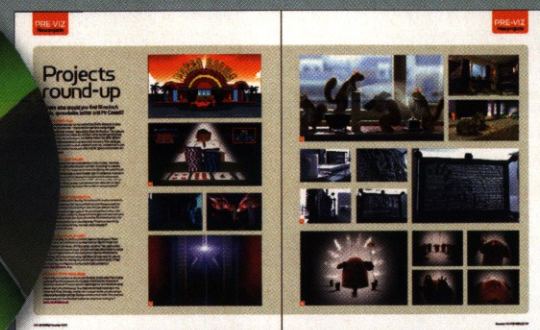
And this seems to be the one area in particular where everyone is in agreement. As consoles become more powerful and creative teams become larger, individual artists will have to deepen their existing skill sets.

"It's a case of doing your homework well," says Blitz's Nick Dixon. "[You should] research into new methods of development and never be satisfied with what you're producing. As an artist, you should constantly be pushing yourself and improving. I've been in the industry for 10 years now and the day I stop learning is the day I give up." ●

● As well as its new lighting and shading capabilities, one of the 360's most important features is its ability to handle geometry. *Project Gotham Racing 3* has seen car geometry increase by a factor of eight. There are more polygons in this bridge than some entire levels in previous games in the *PGR* series

Microsoft's Xbox 360 is set for a US release of 22 November, and a UK release of 2 December

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3DS MAX

robot hordes

A key feature of the Xbox 360 is its ability to instance one character thousands of times. Here's how to create a fully textured robot model ready for a next-gen game engine to turn into an instant droid army **BY CHRIS OLLIS**

Movie clips and images of next-gen games are popping up left, right and centre at the moment, thanks largely to the Tokyo Game Show and the fast-approaching Xbox 360 release date. Each reveals the power and abilities of the upcoming next-gen consoles.

In among the flashy imagery are identifiable key features of the hardware that have been picked up by studios to give their projects a little extra 'wow factor'. Notably, we're seeing hundreds of characters on screen at once. This isn't just down to the sheer power of the machine, but more to an ability to instance one character thousands of times with almost no hit to the processor's performance. Shaders are also clearly playing the role that we expected – not just Normal maps, but multiple passes of specular, diffuse and opacity – to provide a rich canvas of colour for characters and environments. To some extent, fur and hair will also be simulated, though not to the level of an FMV sequence. Likewise, cloth will become more flexible, with faster calculations allowing for higher subdivisions and more instances of it dressing the key characters.

But while there's more room to manoeuvre, the importance of using the poly count and texture space wisely is crucial. The more you save in one area, the more it can be put to good use elsewhere. A studio is just as likely to hire someone who can do a job in half the time as they are to hire someone who can make a model in half the polys!

In this tutorial, we'll build a low-poly robot ready to be instanced hundreds of times in a game engine to create an army, similar to that seen in the next-gen *Sonic the Hedgehog* title. After modelling and unwrapping, we'll cover diffuse, specular and opacity tricks to give our robot some colour coding, as well as the all-important Normal map for cost-effective detail. Finally, we'll combine these textures into an .fx shader ready for next-gen gaming use. The article is intended more as an overview of key techniques than a complete step-by-step guide, so scene files are provided on the CD for you to deconstruct at your leisure.

Chris Ollis is a character artist and animator at Codemasters. We think robots are gradually taking over his life www.intertwined.co.uk

▶

FACTFILE

FOR
3ds Max 7+

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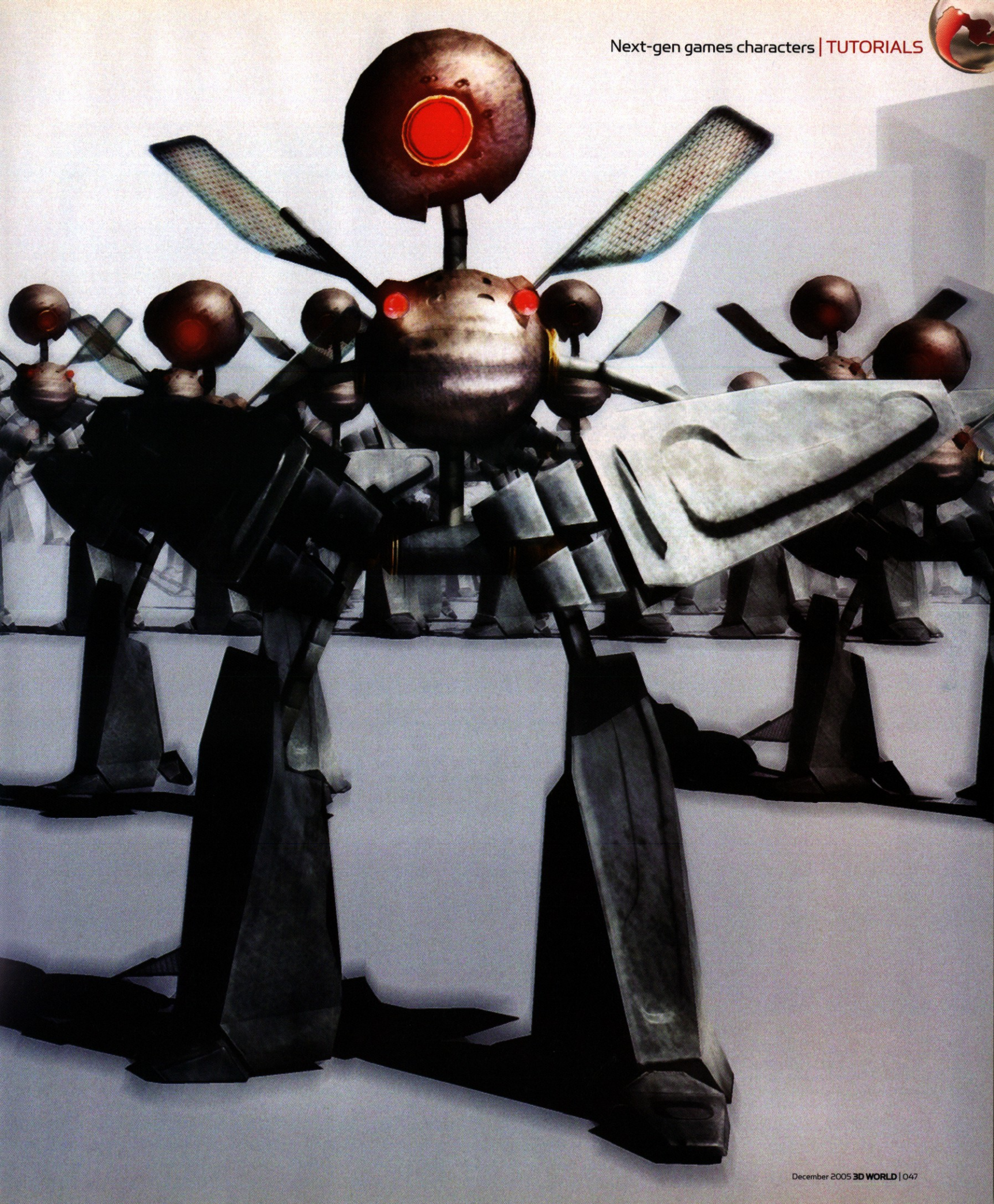Intermediate

TIME TAKEN
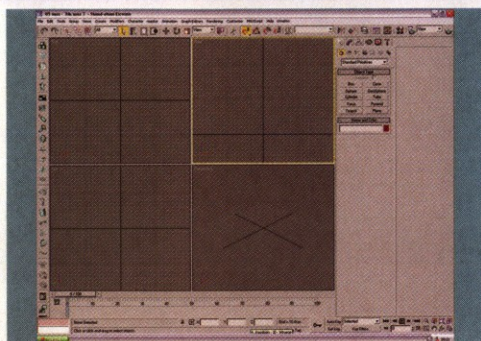Half a day

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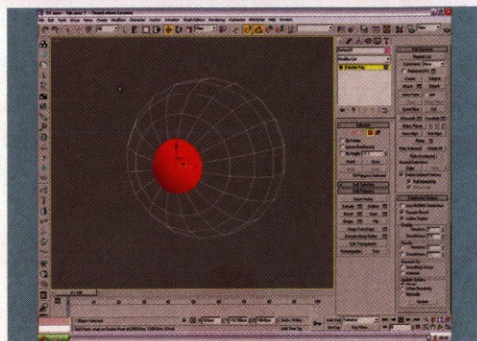
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N/A

STAGE ONE | Initial modelling

01 We'll start by piecing together a simple low-res robot. Feel free to make up your own. Hopefully, these notes will still be of help and inspiration to your design, or at the very least, they may point out a shortcut or two. All you should be bearing in mind is keeping the poly count down. We're aiming for under 2,000 faces.


02 We'll begin by creating a sphere with a radius of 20cm and 18 subdivisions. This will be the basic head. We've collapsed this one to an editable poly and selected the front circle of faces (shown). Extrude them by 8cm, Inset them by 1cm and extrude back in to the head by -2cm. Finally, apply smoothing groups on each extruded section to remove the faceting.
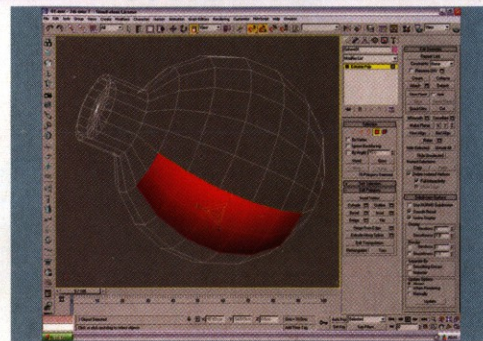
03 Select the faces underneath the sphere and extrude them in to the head by -3cm. Again, remove the faceting along the extruded edges by applying smoothing groups. That's the head finished. We'll now move down about 50cm and create another sphere; same size, same number of divisions for the chest.
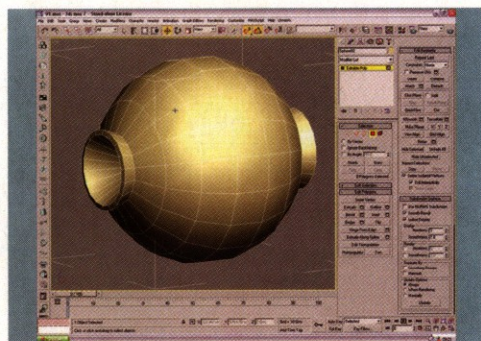
04 Rotate it by 90° to the head and select the same circle of faces (but on both sides this time). There are too many subdivisions here, so select the first loop of vertices and hit Weld Selected, with the range set to 4cm. Bevel the faces out by 3cm with an outline of 1cm, Inset by -1cm and Extrude in by 10cm. Finally, collapse these faces.
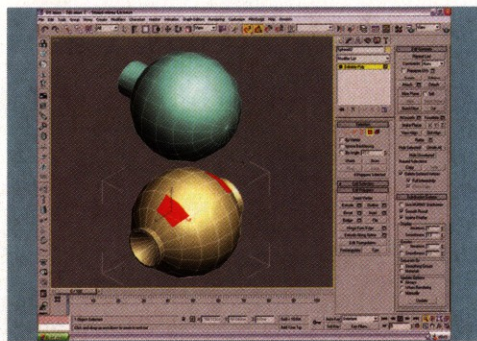
05 Add some simple lumps to the shoulder area for wing fixtures, Bevelling the faces up with a Height of 4cm and an Outline of -2cm, then smooth them off. More Bevel work sinks the neck section and a matching panel underneath, but we want to keep the shape of the sphere, so let's stop there and move on to the forearms.
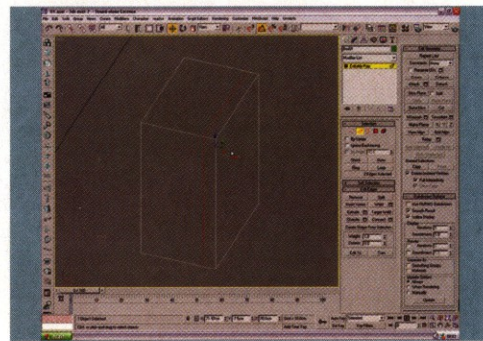

06 Starting with a simple box, Length 40cm, Width 30cm, Height 20cm, add an extra height segment (so there are two). Collapse it to an editable poly and move the height segment across to one side. Extrude the top face up by 30cm and the bottom down by 10cm and scale them in a bit for effect. You can't have everything straight!
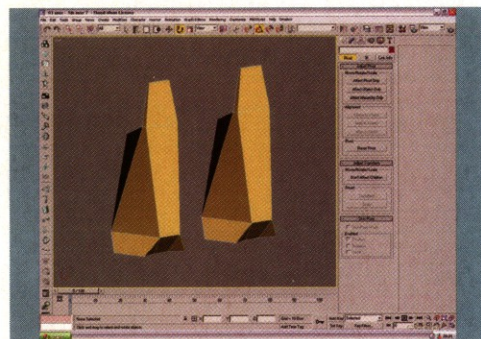
07 For the lower leg, start once again with a cube and pull up a matching section to the forearms. A sense of theme is always good when building characters, whether it's in a monster's anatomical construction, a person's dress sense or, as we have here, in the panelling of a mean robot.
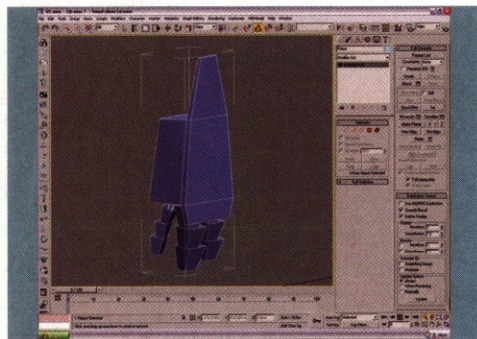

08 From this point on, we've got a feel for our character and can develop the model as the mood takes us. It's easy to get carried away and overcomplicate things, so remember that this is low-poly and keep subdivisions to a minimum. Blocking in is key, especially as we'll be adding further detail later through the Normal map process.
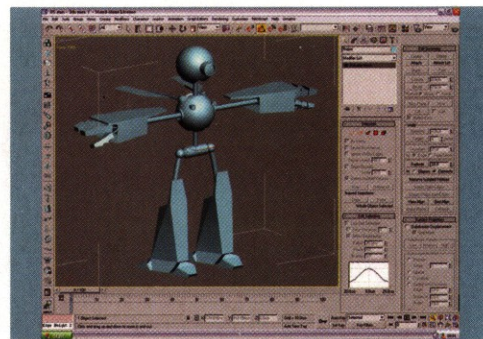

09 With some simple deformed boxes for fingers and toes, some planes for wings and some quickly bent cylinders to join the limbs, the model is just about finished. If you want to take a look at it in more detail and perhaps take it apart, you'll find it on this issue's CD as 'Robot_Model.max'.

STAGE TWO | Unwrapping
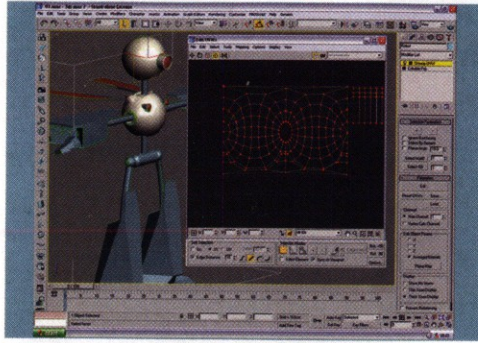
10 Unwrapping is as much of an art form as modelling. Unfolding and unpeeling what you've made in to a recognisable map of body parts can take hours. And the more complex your model, the harder the task is. Fortunately, this is a fairly low-poly affair, so we're going to leave you to it. If you want see how we did it, load up the file 'Robot_Unwrap.max' from the CD.
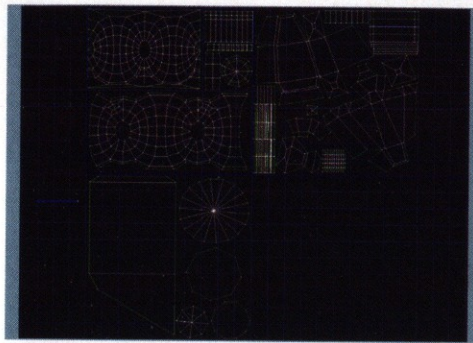
11 Once you've unfolded everything in to a map that you can happily navigate, it's a good idea to arrange the parts into themed areas with separate Material IDs. While next-gen consoles can handle far greater texture map sizes, there's no point wasting texture space. When you start layering up maps, you want to try and avoid needing a 2,048x2,048 image each time.
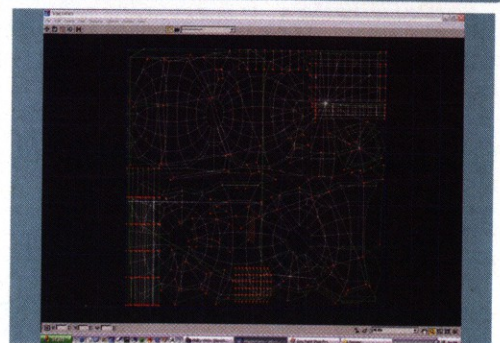
12 With so many factors to consider, it's quite likely that you'll need to rearrange things again and again as you go along. Don't worry and certainly don't get too annoyed. Just try to learn from these changes of direction, so that when you build your next model, you have a better understanding of how you want things.

STAGE THREE | Mapping
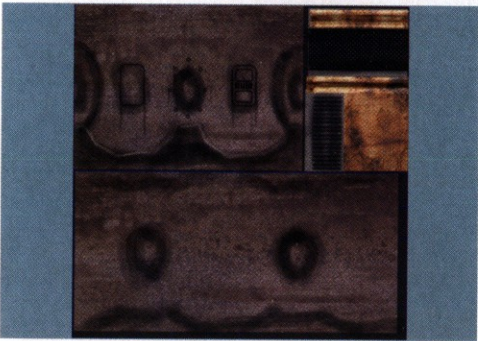
13 The diffuse map used to be all about shading, but with the aid of next-gen technology, most of the shadows can be calculated by the game engine. Don't throw it all away, though. Subtle use of soft shadows and highlights in your bitmap work can further emphasise the texture and help lose any harshness possibly produced from hardware shading.

14 While these robots are geometrically identical, their textures don't have to be. By implementing some subtle or even striking variations in the texture work (in this case, colour coding and ranking symbols), you can help break up the uniform appearance of their sheer number. Areas like this should ideally be arranged into their own small map ... back to that unwrapping again!
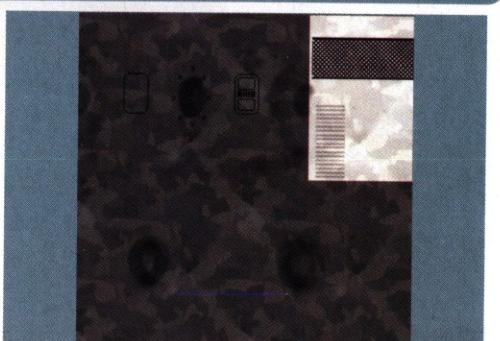
15 Specular maps are important for creating subtle surface texture. The way light plays across a woven silk brocade surface instantly draws the eye. This same technique of matt and shiny surface qualities side by side can be applied to almost any area: rust on shiny metal, subtle motif work on clothing and the incredible variation across human skin.
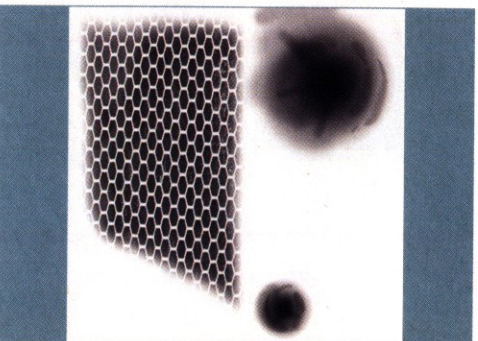
16 You may not need opacity in your model, but it's worth bearing in mind just in case. This robot will have some futuristic transparent wings and a couple of glassy lenses. We've set up the UVW mapping for these to be on their own unique map, as the texture will definitely require an alpha channel to be used for the opacity value.

17 You may also require a reflection map. This is separate from the models mapping, and may well be separate from a global environmental reflection map used by the game engine. A subtly reflecting, greyscale, tiled texture will add yet another level of interest to a surface. But be careful to restrict this to the shiniest of areas again through careful alpha work.
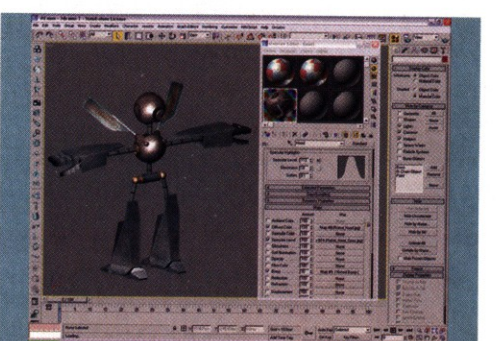
18 Soon, you'll find yourself building up incredibly complex, layered textures. Shader technology on next-gen machines looks set to take this well and truly in its stride with quotes of "thousands of texture passes" already being thrown about! Don't worry too much about overdoing it yet. Just make sure you're doing it.

STAGE FOUR | Normal mapping
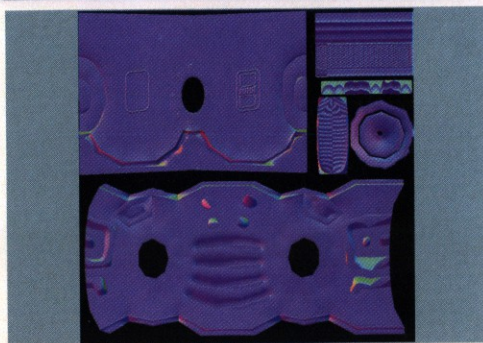
19 Just when you thought the mapping was over and done with, we've got one more: Normal maps. In case you've been living under a rock for the last 12 months, Normal maps are a bit like bump maps but work in three dimensions instead of one (z-depth). To create Normal maps, you can either do some very clever texture work, or more likely create them with a projection modifier.
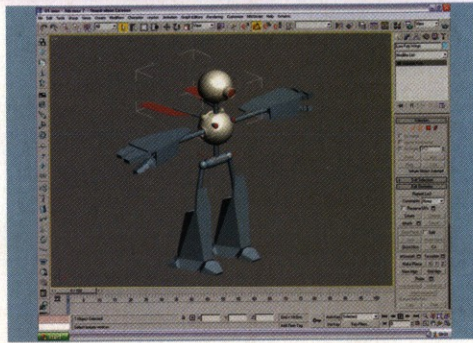

20 We'll have a quick look at three Normal map effects with the robot. Load up the file 'Robot_Normal_Start.max' from the CD. We're going to take this low-poly model and res it up a bit, apply some bump mapping and then calculate the Normal mapping, which can then be reapplied to the original low-poly mesh.
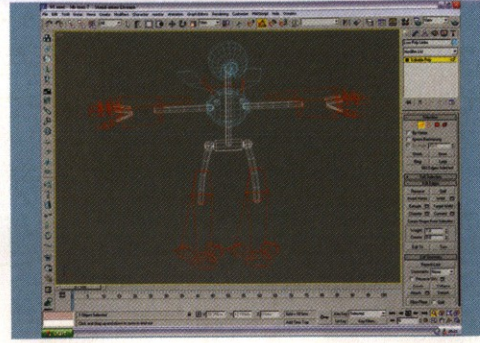

21 To begin with, we'll look at adding some simple curvature to the 'boxy' bits. Select the blue body parts and select Edge from the Sub Objects panel. Select at least one edge from each boxy section (fingers, forearms, legs, toes and wing strips) and then hit the Grow in the Selection panel until all the edges of these parts are selected.
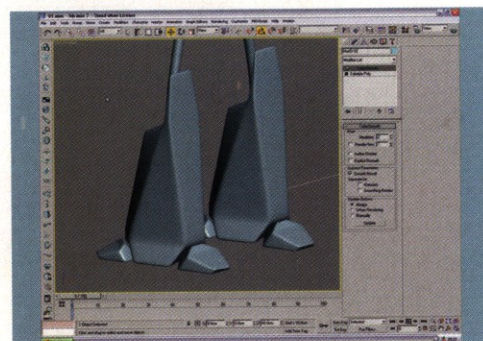

22 Select Chamfer from the Edit Edges Panel and drag on an edge until you have a nice, thin chamfer. This is all we need to preserve the integrity of the 'boxier' objects when we apply a TurboSmooth modifier to the model. Apply one now to see how the areas react. We recommend two iterations, at least.
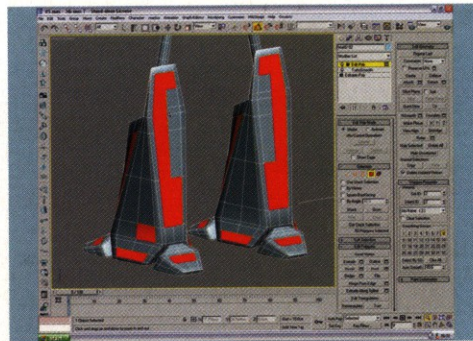

23 Staying with the legs for a moment, we'll add some simple panelling. With TurboSmooth still on, drop it down to 1 iteration (we'll add the other one again later) and apply an Edit Poly modifier. Select Polygon from the Selection panel and highlight a few polys that you would like to see protruding a little.
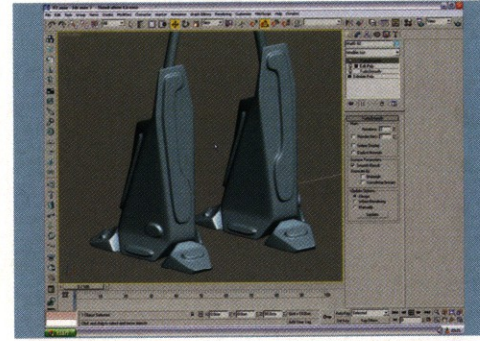

24 Select Bevel – we went for a height of 1.5cm and an outline of -0.75cm. Apply an inset to these faces to maintain the hard edge. Before applying TurboSmooth, take the iterations up to 2 and you'll see some interesting panel shapes. We're going to do this over the rest of the robot, but we'll save you the repetition here.
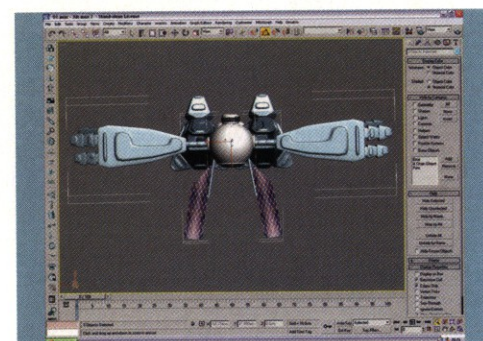
25 Before we calculate the Normals, we can also boost them through Bump maps. If you apply standard greyscale images to material's Bump map slots, the data will be carried through in to the final Normal map. We've applied some simple bumps to the wings and head texture. Load the file 'Robot_Normal_Ready.max' and look at the hi-res model before we extract its Normal data.
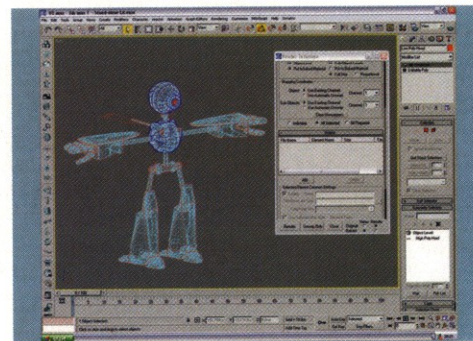

26 We'll now run each body part/Material ID through the Projection Modifier. The robot is split into separate parts so that we can retain the Mapping coordinates and not jumble them together. To start, select the Low Poly Head, open the Render to Texture dialog (shortcut [0]) and, from the Projection Mapping window, select Pick and then High Poly Head from the list.
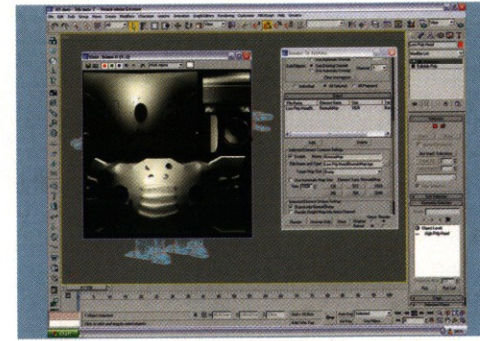

27 Tick the 'Enabled' box and 'Use Existing Channel' tabs. From Output, select 'Add' and pick 'NormalsMap'. Select a map size – we're using 1,024, though we may resize later – and finally Output to Normal Bump. Hopefully, you'll get a result like this. The Normal map can then be applied to your low-poly model as a 'NormalBump' in the Bump map material slot.

STAGE FIVE | Putting it all together
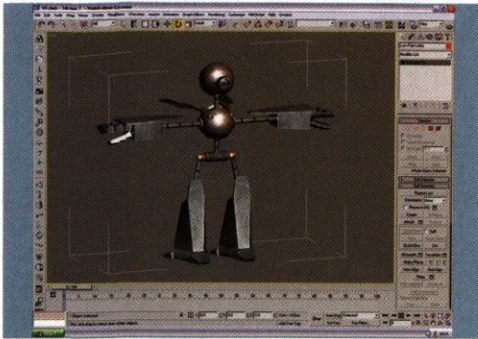
**28** Now to stick everything together! Load up the 'Robot_FX.max' file from the CD (it's the low-poly robot with all the maps and masks applied). If you render it, you'll see how the textures work together. This is great, yet the real beauty of .fx shaders is that they work in the viewport, so lets get them up and running.
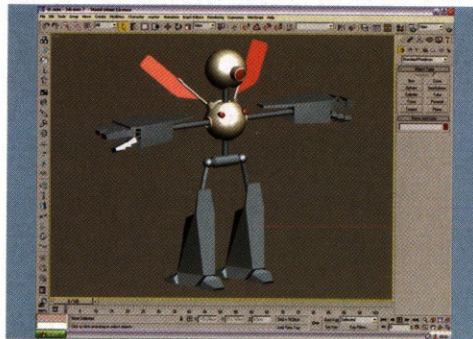

29 The first thing you need to be sure of is if your graphics card can handle the technology. Shader updates seem to come around quicker than processor updates, so don't be overly surprised if this doesn't work completely. The current standard is Shader 3 technology, which is also the basis for next-gen machines.
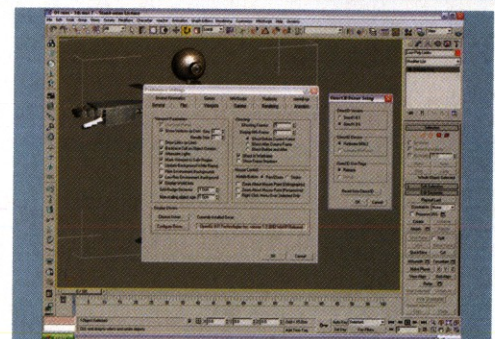

30 If you're sure your graphics card is up to the job, then you need to ensure you're running *3ds Max* in Direct3D mode. To check, go to Customize > Preferences > Viewports and click the Choose Driver button. Make sure it's running in Direct3D mode and is set to DirectX 9.0 in the advanced section. You'll need to reboot to update any change in settings.
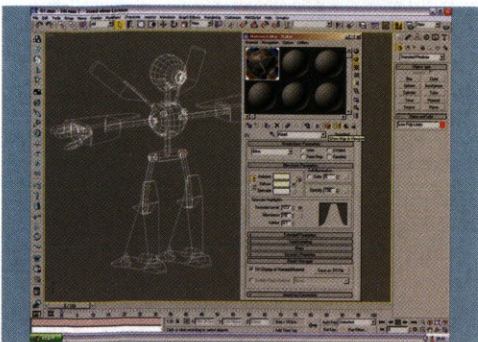
31 With that working, we can now switch things on. Open up the Material Editor and, for each of the robot's submaterials, scroll down to the bottom of the map list to find the DirectX Manager. Tick the 'DX Display of Standard Material' box, then click the pink-and-white cube version of the 'Show Map in Viewport' icon to reveal all.
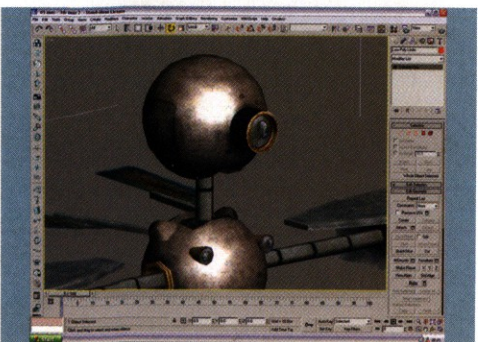
32 Depending on the quality of your graphics card, you may get varying results. Hopefully, you can see the Normal maps in action, if not the multi-layered textures. To save the map as an .fx file, you simply click on the box in the Material Editor's DirectX Manager and there you go. Now you just need a game engine to run it in to create your own instant droid army!
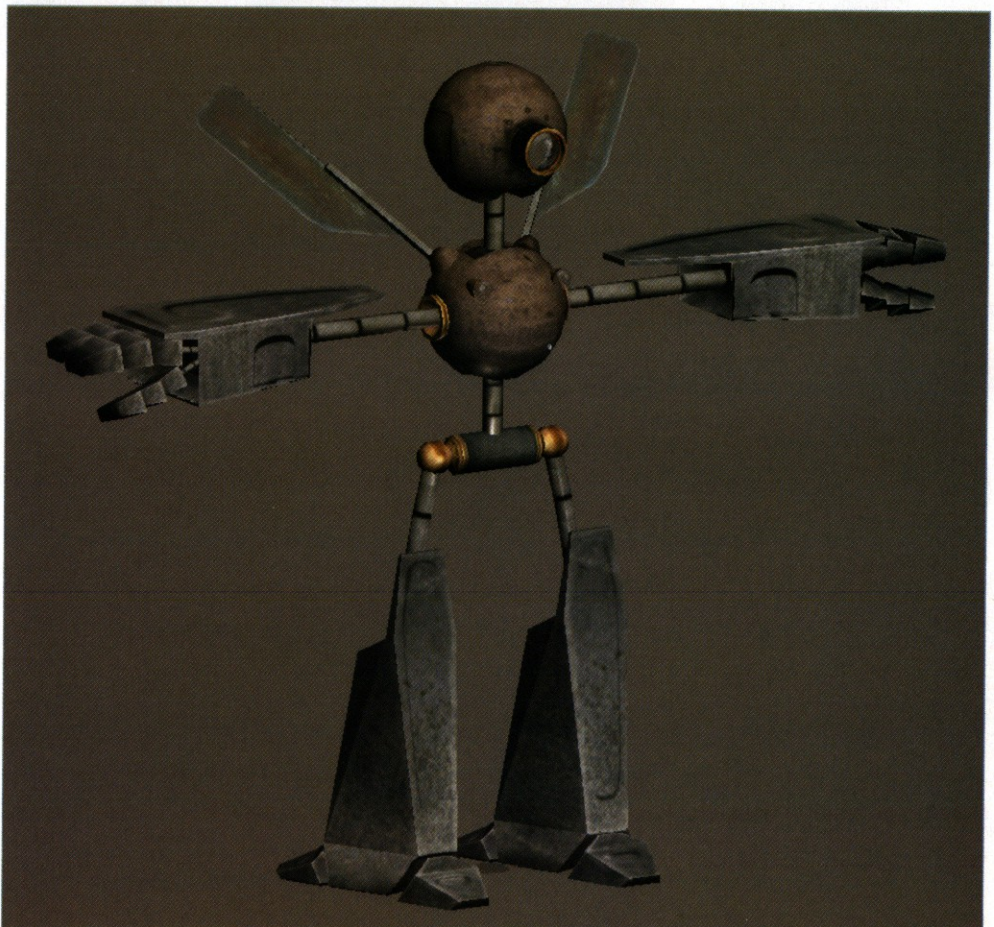
33 Whenever next-gen technology steps (or leaps) forward, people always get excited by the advances in game visualisation; the blinding oohs and aahs of arcade eye candy. But you should also be getting excited about the steps forward in the world of 3D applications. As requirements for multipass renderers, complex bone rigs, facial mocap and, of course, higher poly counts become more widespread, the pressure is on for software manufacturers to keep up to date. While *3ds Max 7* gave us Normal map projection and .fx shaders almost a year ago, what game-oriented delights will we see in *3ds Max 8*? Greater .fx control? Easier animation exports? Faster unwrapping? You'll just have to wait until next month's issue of *3D World* to find out. ●

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LIGHTWAVE 3D

Get started in CG lighting Part 2

In the second part of our guide to CG lighting, we take a look at the advanced lighting tools in LightWave 3D. Follow the walkthrough and create the dazzling set-up shown above

BY NICHOLAS BOUGHEN

FACTFILE

FOR
LightWave 3D

DIFFICULTY
Elementary

TIME TAKEN
30 minutes

ON THE CD
• Full-sized screenshots
• Base model (LWO format)
• Start and finish scene files
• JPEGs used in the scene files

ALSO REQUIRED
N/A

ast issue, in part one of this series, we looked at the five light types available in *LightWave 3D* and explained how to set up a simple four-point lighting rig. If you missed that part, don't worry: this instalment will continue our introduction to CG lighting using techniques that can be applied in many programs.

Use this tutorial to discover the advanced lighting tools in *LightWave*'s Global Illumination panel, including Backdrop Only radiosity, then set up a simple but effective lighting rig using image-based lighting and a single, small Area light. In parts three and four, you'll make CG lights behave like real lights, and set up an indoor and outdoor lighting environment.

First, an explanation of a key lighting term: radiosity. In the real world, all light bounces and reflects around the environment until it's absorbed. These reflections can occur hundreds, thousands or even millions of times depending on the surface properties of the environment. CG lights, on the other hand, do not reflect by default; all of the light from CG sources is absorbed. This means that 3D renderers need to deliberately calculate light-ray reflections.

In the old days, before radiosity was available as a rendering feature, 3D artists used to fake it, cleverly placing lighting instruments to mimic the way light bounces. This trick is still used but is fast becoming a lost art; as renderers and hardware become quicker and smarter, the need for fakes, tricks and hacks is diminishing. Beautiful, more physically accurate lighting can now be produced with much less effort.

Be aware, though, that advanced lighting requires longer render times. If your goal is photoreal effects or truly stunning renders, you should accept this as a fact of successful CG lighting.

Start by opening *LightWave* and loading up the scene named '3dw_LWLighting_part2.lws' from the cover CD. Click on the Lights mode button at the bottom of the interface, then hit the [P] key to open the Light Properties panel. You're now ready to begin.

Nicholas Boughen is CG Supervisor at Rainmaker in Vancouver. His work includes *Dead Like Me* and *I, Robot*. He is the author of *LightWave 3D 8 Lighting*, and training videos for KURV studios. www.rainmaker.com

STAGE ONE | Advanced lighting tools
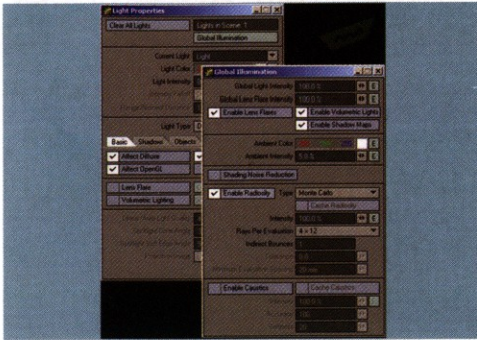
01 At the top of the Light Properties panel, click Global Illumination (GI) to open the GI panel. From here you can globally change Light Intensity, enable Lens Flares, Volumetric Lights, Shadow Maps and Ambient Intensity. You can manage the Ambient Colour settings and enable either Radiosity or Caustics. Shading Noise Reduction improves lighting quality for Radiosity and Area lights.
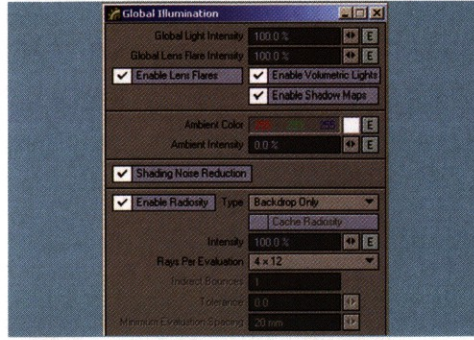
02 In the Global Illumination panel, set Ambient Intensity to 0%, turn on Shading Noise Reduction and enable Radiosity. Click in the drop-down box next to Type and select Backdrop Only from the list. Leave all the other settings as they are.

03 Press [Ctrl]+[F5] to open the Backdrop Options. Click on the Gradient Backdrop box to add a generic Sky/Ground gradient. This quick gradient is useful for test renders. Set Zenith Colour to 132, 190, 255 and Sky Colour to 172, 225, 255. For more complex renders, click the Add Environment bar at the bottom and Add Textured Environment to insert an image or a custom gradient.

STAGE TWO | Image-based lighting

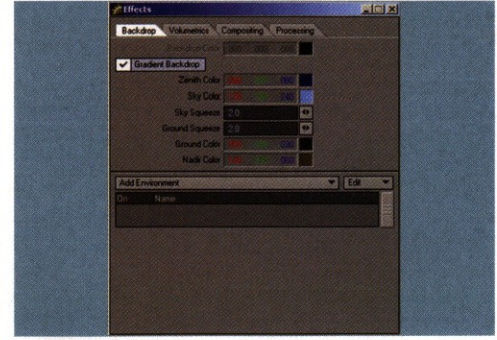**04** Click on the Lights mode button at the bottom of the interface and then press the [P] key to open the Light Properties panel. Be sure that Light Intensity is set to 0% before continuing. Render the image by clicking [F9]. Although the only light in the scene is turned off, the scene is still illuminated because we have instructed *LightWave* to emit illumination from the backdrop.

EXPERT TIP

Types of radiosity
Backdrop Only radiosity is like Ambient Occlusion: no radiosity bounces are calculated, but light is emitted from the entire backdrop. It's a great way to simulate skylight. The backdrop does have to have some colour in it, so set a colour, a gradient or an image into the backdrop. Monte Carlo radiosity will calculate radiosity bounces, yet takes longer to render; the more bounces you add, the longer the frame will take. Interpolated radiosity enables you to shorten render times by letting the renderer 'guess' the lighting values in a scene.
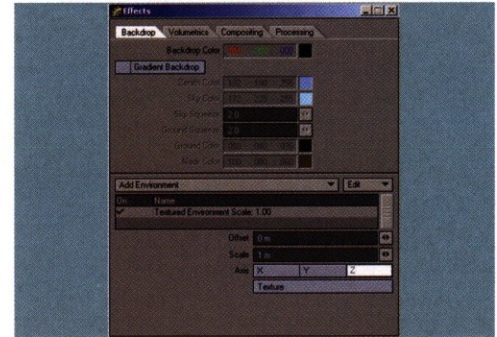
05 Open the Backdrop panel again and turn off Gradient Backdrop. Click on the Add Environment bar, then on Add Textured Environment. Now click Textured Environment, select the Y axis and click on Texture to open up the Texture panel.
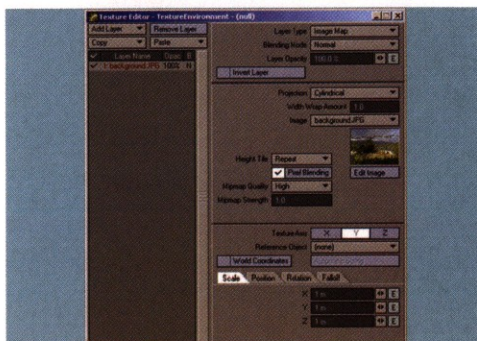
06 Set the Layer Type to Image Map. Set Projection to Cylindrical and the Texture Axis to Y, then click on the Image drop-down menu to load the image background.jpg from the cover CD. You can leave all other settings in the panel as they are.

07 The first thing you'll notice when rendering this image is that the light colour is extremely varied. Because this light colour is taken from the image - which is an outdoor photograph - you can see highlights in the render caused by coloured light coming from many directions. This effect is called image-based lighting and it adds a brilliant level of detail.

08 Open the Image Editor by typing [F6]. Select the image called background.jpg and click the Replace button to replace it with white-square.jpg. As you may expect, this is black with a white square in it. Wherever the image is black, no light will be emitted from the backdrop; wherever the image is white, light will be emitted. Now render the frame.

STAGE TWO (Continued) | Image-based lighting

09 Note how much this technique mimics the use of a single, large Area light in the scene. You can see clearly that the light source comes from the left of the frame – this is where the white portion of the image exists in the backdrop. Let's try adding some colour now. Using the Image Editor again, replace the image named white-square.jpg with coloured-light.jpg.

10 Because we're creating a lighting rig via image-based lighting, we have specifically placed and coloured the squares so they would match the position and colour of lighting instruments. There's one main disadvantage t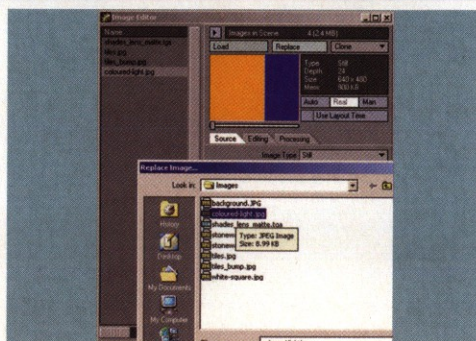o this system: since there's only one Radiosity Intensity value, all lights in the scene will have the same level of intensity unless the Colour value is carefully adjusted for each square.

11 Press [F9] to render. Notice that the tile floor seems quite blue. This is because it has Reflectivity turned on, and in addition to being illuminated by the blue side, this is also reflecting that colour. There are amber highlights along the tile edges, and if you look closely, you'll see two shadows: one occluded from the blue side and one from the amber side, indicating two distinct light sources.

EXPERT TIP

Two techniques
This tutorial demonstrates the versatility of image-based lighting. Whether you use photos in the backdrop or hand-drawn images, you have specific control over how the image illuminates your scene. For most everyday purposes, this technique may take too long to render if you don't have access to a render farm, so mix image-based lighting with instrument lighting. It's useful to choose an appropriate backdrop image for your Fill light source and provide a more direct light source through a Spot light, Area light or Distant light.

12 For the final image, pictured above, we've replaced the backdrop image with the original background photo. This produces a good Ambient and Fill light solution. We want the glasses to appear to be outside, so we've also added an Area light with the right size and intensity to simulate sunlight. If you recall from part one of this series last issue, the shadows should be quite hard-edged with a little softness at their furthest point from the glasses. Load the scene '3dw_LWLighting_part2_finished.lws' to see the final set-up. You could easily switch the Backdrop radiosity to Monte Carlo radiosity, to try out radiosity light bounces. However, with this object, much of the material is quite dark and most of it is semi-transparent, so it's unlikely that you'll see much difference. ●

©2004 Disney/Pixar

Pixar reveal their Escape plan.

Escape Studios is a hub of 3D and visual effects expertise providing training, software and talent to the computer graphics industries. Pixar, the makers of Finding Nemo and the Incredibles (pictured), recently appointed Escape Studios as their European reseller and training partner. This includes full representation for Pixar's Academy Award®-winning RenderMan® software. Find out more at www.escapestudios.co.uk.

Escape Studios®

How can you lessen the trials and tribulations of combining CG material with live action? Delve into these pro tips from one of the lead matchmovers behind *Harry Potter*

TIPS & TRICKS

The rules of camera tracking

Even on low-budget shorts, bluescreen work is an essential part of the modern VFX artist's toolkit. Try out these expert tips to ease the process and improve the quality of your footage **BY TIM DOBBERT**

Our expert this issue...

Tim Dobbert
Tim is Matchmove Supervisor for The Orphanage, San Francisco, and is the author of *Matchmoving: The Invisible Art of Camera Tracking*. His credits include *Sin City* and *Harry Potter and the Goblet of Fire*
www.theorphanage.com

As the practice of combining live-action footage and computer-generated elements becomes more common, matchmoving has taken on an increasingly valuable role in visual effects. Despite its importance, though, it's often one of the least understood disciplines in the industry. Camera tracking in particular is a mystery to many visual effects artists, even to those who have had to do it themselves.

The basic premise of camera tracking is relatively simple. In order to get a good camera track, matchmovers must reproduce the movement of the camera that was used to film the live-action plate. If they can do this, then any 3D object that's placed in front of their virtual camera will appear to be locked to the footage as if it were a part of the scene. However, as anyone who's ever tried it will confirm with a knowing and rather tired look, it's not always so simple.

The first step in this process is to '2D track' features within the plate in a matchmoving program. Next, the program analyses the 2D movement of the tracks and tries to calibrate, or 'solve', for the camera. The software then calculates the camera's 3D position, rotation and other settings, such as focal length. If all goes well, the virtual camera generated by the matchmoving program will closely match the movement of the original camera. The resulting camera is then exported to a 3D animation program where it will be used to render the 3D elements being added to the scene.

Over the following three pages, you'll discover some useful camera tracking tips that will cut out a lot of time and suffering! These tips cover a wide range of topics within the matchmoving process, from shooting on greenscreen to delivering that all-important final scene. After all, there's much more to camera tracking than just tracking cameras.

● The features you track should give a good sampling of the 3D space. Besides tracking markers, this could include C Stands and lights

TRACKING ON BLUESCREEN

Tracking markers should meet two key requirements: trackability and keyability. For bluescreen, white or black markers will be easier to track, but may have to be rotoscoped if they cross behind the foreground subject. Try using markers that are a similar colour as the blue or greenscreen, but a lighter or darker value. Brightly coloured markers can be keyed out with the rest of the background.

MAKING A BETTER MARKER

Matchmoving programs track corners better than curves. It's easier to track the corner of a square or triangular tracking marker than the edge of a round one. Triangles and squares also have the advantage, in that if the camera gets close to them, they'll still have trackable corners. Circular markers can be difficult to accurately track in close-up shots because they become very large and indistinct.

MAKING A BETTER MARKER II

The problem of what to use as a tracking marker often comes down to what you have to hand. For bluescreens, an 'X' of gaffer tape will work. Small neon-coloured Post-its also make good tracking markers because they can easily be removed. However, while they're great for the short-term, they can peel up or fall off under the heat of the lights. For long-range exterior shots, golf balls are a better option, or tennis balls that have been cut in half. For night-time or low-light shots, LEDs are good (it's easy to find keychains with LEDs, so you don't need to be an electrician to rig something up). Make sure the markers are visible, removable and the appropriate size for the shot.

PLACING MARKERS

Be methodical about how you place tracking markers. Put them at regular intervals rather than randomly sprinkling them around the set. On bluescreen, place them in a grid pattern of squares. Having tracking markers that are a known distance apart will make it easy to establish the scale of the scene, and easier to line up in your 3D environment. Matchmoving programs generally need 7 to 12 trackable features onscreen at any given time, so the distance between markers will depend on how tightly the shot is framed.

SAMPLING THE SPACE

A good way to think of tracking markers is that they're sample points of the 3D space. Try to place markers at various depths, heights and widths in order to help establish parallax, particularly

IN FOCUS | Keying mattes in *PFTrack*
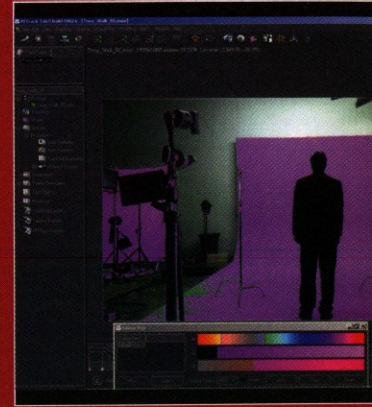
Having a good matte during automatic tracking can often improve the quality of the overall solution, but making mattes in a separate program can be a rather time-consuming process, and a hassle you don't need. Most matchmoving applications these days have the capability to create mattes, but The Pixel Farm's PFTrack takes this functionality one step further. It actually enables you to key out portions of the image, which is a handy feature when you're working with greenscreen footage.

if the camera is going to be in motion. Position tracking markers in areas where CG objects are going to be placed. If the live-action element will interact directly with a CG element, such as the floor, place some tracking markers at or near the point of contact.

TRACKING INTERIOR/EXTERIOR SHOTS

If you're not shooting on a blue or greenscreen, the best option is to use no special tracking markers at all. If there aren't enough features in the scene to track, try adding a prop or other set dressing to give it some trackable details. This is better than adding a bright red tracking marker that will need to be painted out later.

DON'T MAKE PEOPLE HATE YOU

While tracking markers will help facilitate the matchmove, they should never trump the decisions of the creative decision makers on-set (namely the director, DP or visual effects supervisor). A more common dilemma is whether the tracking markers that make the matchmover's life easier are going to make the roto/paint artist's life more difficult. Whenever this situation arises, it's best to defer to the visual effects supervisor, or someone who can make decisions regarding the entire pipeline. If this is you, then carefully weigh up the factors and decide on which will be the least painful route.

DOCUMENTING THE SET

A thorough documentation of the set can save you a lot of time when you're fitting your matchmove camera into the CG environment. Make a diagram of the set that includes the

● Despite the lack of special tracking markers, a shot like this one provides plenty of features to track. Adding markers would result in unnecessary paintwork
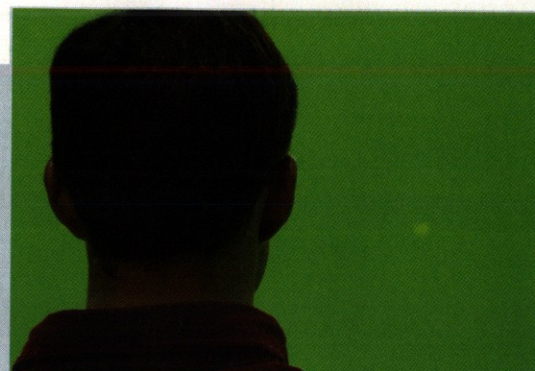
▶

measurements for all major set pieces, positions of actors, relative positions of props and so on. At the same time, take plenty of pictures of the set. Take a picture of the camera set-up for each shot, so you can get a sense of its relative position to other items. After the shoot, transcribe the measurements onto the images in *Photoshop* and use arrows and text to indicate what they represent.

CAMERA REPORTS

Bring a camera report form to the set that has fields for all of the measurements you'll be recording, then fill it out as you proceed from take to take. A pocket-sized report is best, preferably spiral-bound with a soft plastic cover. These are small enough to tuck away in your back pocket and sturdy enough so as not to lose any pages. You can have these printed and bound at copy stores.

2D OR NOT 2D?

Always consider whether you can track a shot in 2D, since this is often the simpler solution. Small pans, drifts or side-to-side dollies are good candidates for 2D tracking. Forward/backward dollying can sometimes be 2D tracked, but you'll need at least two tracking markers visible at all times. If an actor in a live-action plate is coming into direct contact with a CG element, it may rule out 2D tracking, since it will be more likely to reveal the 2D cheat.

● Taking measurements is an essential part of being on set. The more measurements you have, the easier it will be to get your camera placed successfully in the 3D environment

● Blurry backgrounds can introduce noise into the final camera solution. Blurring a bit more provides smoother 2D tracks

BE A LAZY TRACKER

Carefully evaluate the shot and determine how long the CG elements are going to be onscreen, where they're going to be in the shot and how they're moving. Only track the frame ranges during which the CG element is expected to be onscreen. If the element is only seen in a small portion of the frame, you can focus on making sure that this area is locked tightly, even if it means letting other areas go a bit. In other words, it's OK in this case to be a little lazy: track only what you absolutely must track. Be careful though – if later on you find out the object will be onscreen for longer, or in other parts of the environment, you may end up having to start over with the matchmove.

KEYING MATTES IN PFTRACK

During each take, you should try to get the 'big three' measurements: focal length, height of camera and distance to subject. These make placing your matchmove camera much easier once you're in the 3D application. Also, note what type of camera, lenses and filters were used for the project, in case you need to look up their technical specification on the web later. If the camera is moving during the shot, record its start and end positions, too. If you can get the tilt and Dutch angles of the camera, that's a bonus.

OUT-OF-FOCUS BACKGROUNDS

Tracking on a blurred background can often introduce high-frequency noise into the tracker and subsequently into the final camera solution. This is particularly true if the plate was shot on film, because of the grain. Oddly enough, adding a couple of pixels of additional blur to the footage before you track can significantly reduce the noise in your 2D track – it sounds strange, but it certainly works. The reason for this? Trackers work at the pixel or sub-pixel level, so blurring the plate will smooth out the grain and stop them from tracking irrelevant noise.

RACK FOCUS PLATES

During a rack focus, there's often a noticeable amount of 'lens breathing', which means that the focal length alters slightly as the focus changes. If you're having trouble getting your objects to register properly through a rack focus, try letting the matchmoving program solve the shot as a variable focal length shot (as though it were shot with a zoom lens). This allows the program to compensate for the focal length shift and make the objects stick better.

IN FOCUS | Proxy images in *boujou*
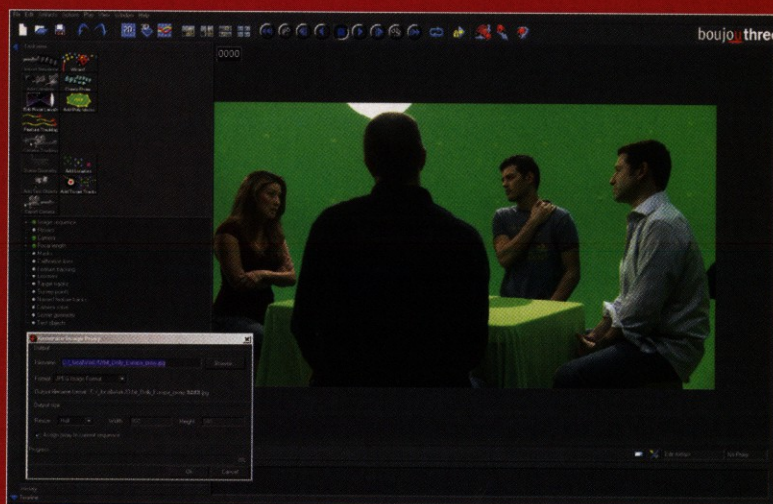
It's always best to work at full resolution where possible, especially when you're working with 2K or HD footage. However, this can be painfully slow when you're dealing with large formats or long sequences. 2d3's *boujou* gets around this problem by allowing you to generate low-resolution proxy images to take the place of the hi-res originals. Internally, *boujou* still tracks the full-resolution plate, but it displays the proxy onscreen, making it easier to get through a project.

ELASTICS IN MATCHMOVER PRO
While tracking an object has become a fairly routine thing, many people don't realise that you can use objects to track cameras. In Realviz' *MatchMover Pro*, you can use the Elastics feature to correspond vertices of an imported model to features tracked on the same object in the plate. This feature is extremely useful when you need your camera track to fit precisely with an existing model.
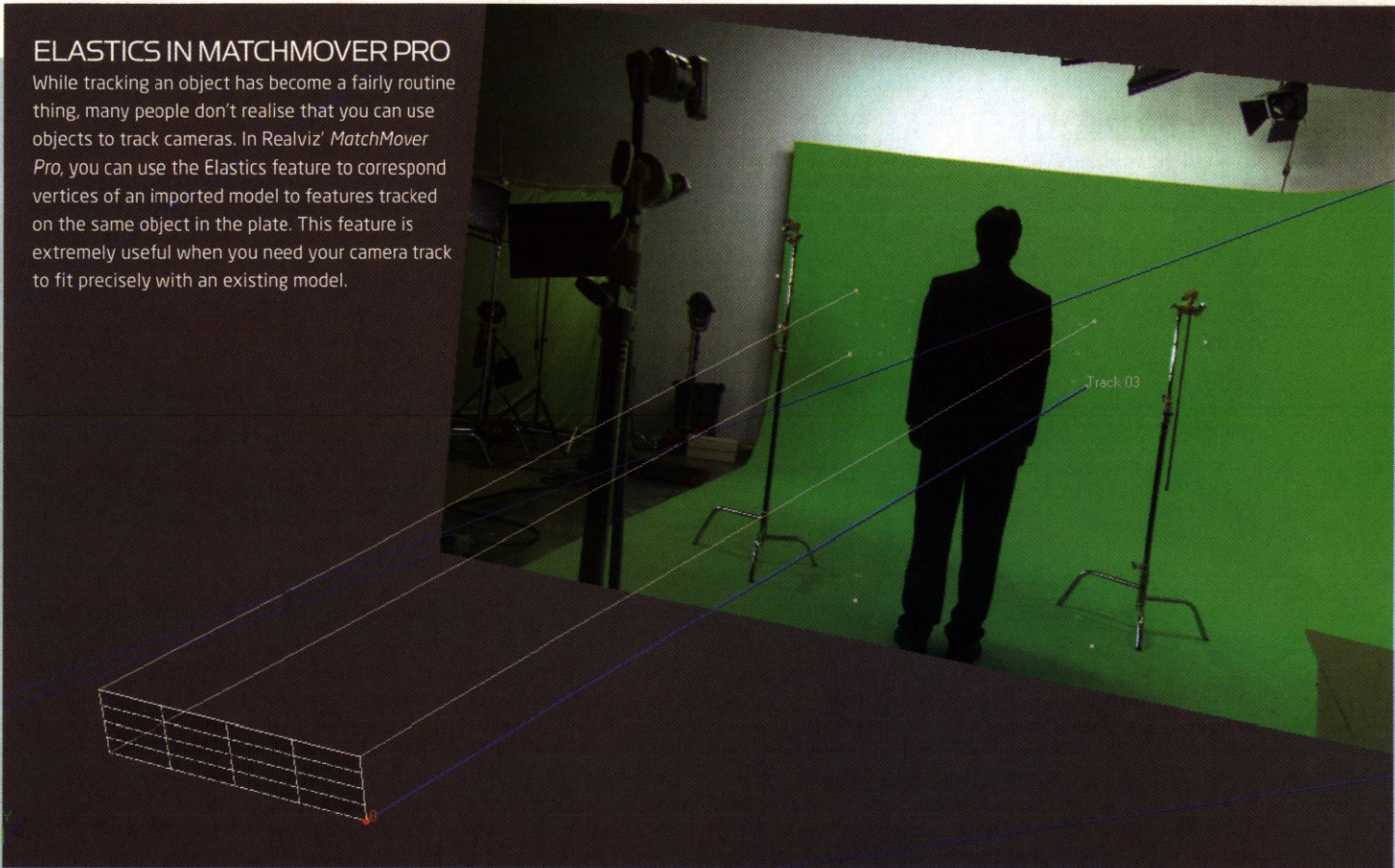
FILM BACK AND FOCAL LENGTH
If you want to solve for an exact focal length, you'll need to know what size of film back was used, because together they define the angle of view (AOV). If you don't care what focal length the matchmoving program solves for, you can just let it solve the focal length based on the film back settings it uses by default. The program's solving engine will automatically adjust the focal length to achieve the same AOV. This is how a matchmoving program seems to be able to miraculously solve for the focal length, even though you haven't given it any specific data.

MOVING THE WORLD
If you're having difficulty getting your scene oriented properly in the matchmove program, don't sweat it. You can always adjust the orientation of the camera in your 3D application by parenting the camera and tracking markers under another object and moving, rotating or scaling them as a unit. The camera and tracking markers must be moved together in order to avoid breaking the matchmove.

HANDY PARTIAL SOLUTIONS
If you can't get a good solution for the whole shot, try solving for limited frame ranges of the shot. Sometimes you can blend together two or more partial solutions in your 3D application to get most of the shot figured out. At the very least, it beats having to matchmove the entire shot by hand.

TRY USING A DOUBLE
Sometimes, adding a model of a person to your 3D scene to represent an actor seen in the plate can help you fit your camera into the environment. This is particularly true of shots where there are few visual clues as to the scale or orientation of the scene. The model doesn't need to be an accurate representation of the actor – it should just be approximately the same build and scaled to be the same height as the actor.

ALTERNATIVES TO CHECKERBOARDS
Checkerboards usually work well for checking the matchmove over broad, flat surfaces, but they may not be the best solution for every situation. When checking for foot slide, try using a more detailed, high-contrast, irregularly patterned image for a texture. It's more likely to reveal small slippage, yet it's less likely to flash and buzz like a small checkerboard pattern would.

LOCKING DOWN THE SCENE
When you're working in a large pipeline, make your scenes as organised and indestructible as possible. Make sure you've identified key objects in the scene and that you've named your camera so everyone knows it's the final matchmove camera. If your animation package supports it, lock the animation channels of the camera. This helps prevent other artists downstream (or even yourself) from accidentally moving the camera and breaking the matchmove. ●
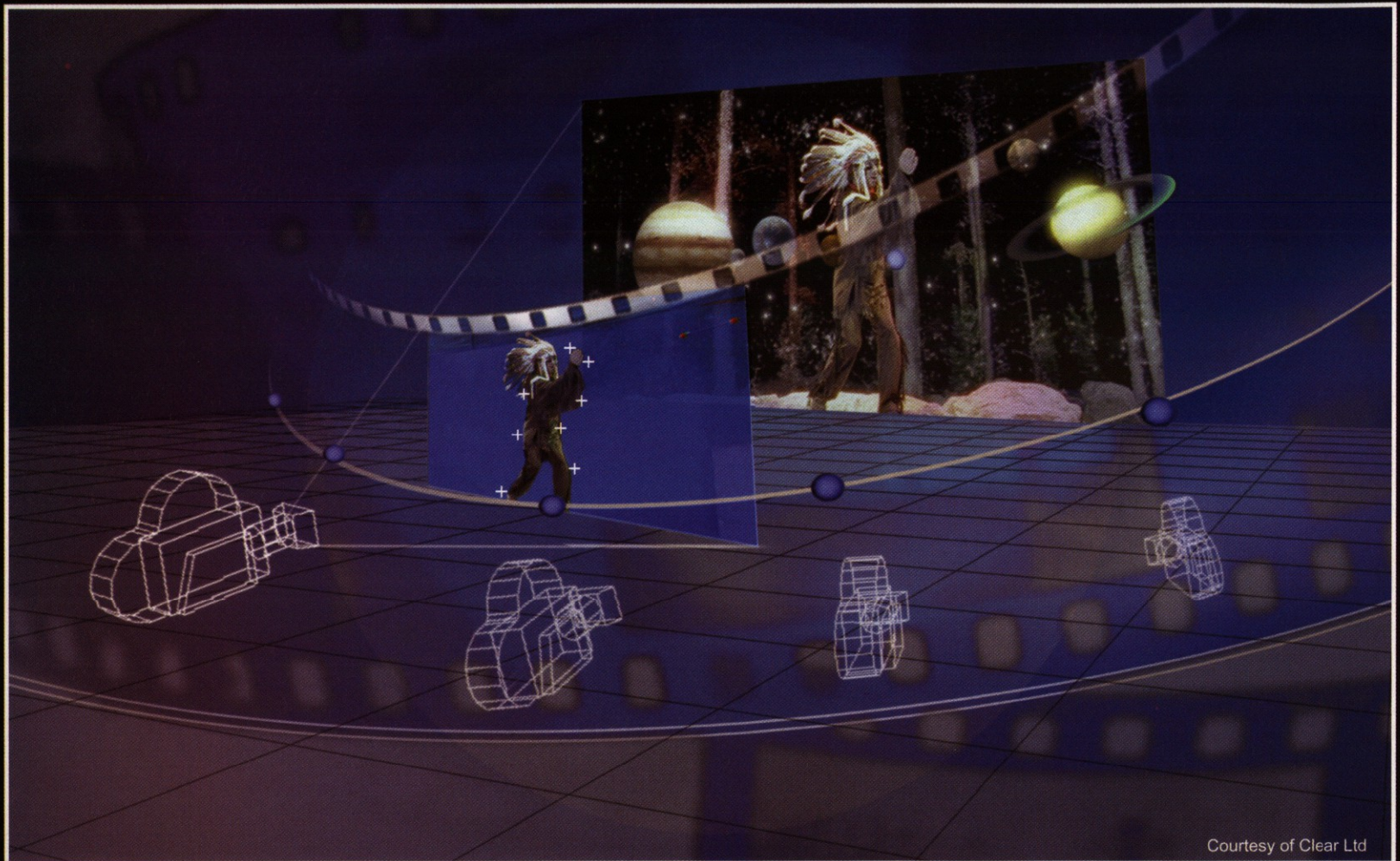

● Tracking markers that are a similar colour to the greenscreen can be easily keyed out with the rest of the background

● **FURTHER READING**
Intelligent facial capture:
http://graphics.stanford.edu/
~fedkiw/ (see 'Automatic
estimation of facial muscle')

Win ZBrush 2

3D World teams up with Pixologic to give away four copies of ZBrush 2

This issue's competition offers you the chance to own the modelling and texturing tool, *ZBrush 2*. The program has grown massively since its launch at Siggraph 1999. With its real-time sculpting and texturing of multimillion-poly models, it will carry your digital art to the next level of realism and artistry.

ZBrush 2's fast, handsomely optimised code innovations and unique features provide more power to create models with unparalleled levels of detail. Medium- to high-resolution models respond instantly to sculpting actions, constantly rendered and shaded in real time. The program offers revolutionary modelling, surfacing and texturing techniques, while intuitive controls focus these powerful resources on the creation process.

Experience what Andrew Cawrse, ILM CG Model Supervisor and Concept Modeller calls, "the ultimate digital freedom for raw artistic skill and creativity. *ZBrush* has all the tools you need to develop high-end creatures and detailed environments!"

Pixologic is offering four *3D World* readers the chance to win *ZBrush 2* for Windows or Mac, which will include:

• *ZApp Link* – a plug-in that connects *ZBrush* with any graphics-editing programs that accept PSD files

• *Displacement Exporter* – a plug-in that includes the ability to export out three-channel RGB displacements, as well as 32-bit floating-point displacement maps

• *ZMapper* – a plug-in for generating normal maps that greatly enhances *ZBrush's* current functionality

In addition to the copies of *ZBrush 2*, Pixologic will also provide each winner with a free upgrade to version 2.5 – so once you've tried out the version 2 feature-set, you can get your hands on the brand new release as soon as it becomes available.

For a chance to win *ZBrush 2*, simply answer the following question and complete the tie-breaker opposite:

QUESTION

At what tradeshow was the first version of *ZBrush* originally announced?
a) MacWorld 1999
b) Siggraph 1999
c) Game Developer's Conference 1999
d) E3 1999

2D & 3D PAINTING, MODELING & TEXTURING

TIE-BREAKER
"If I won *ZBrush 2*, I would create ..."
(please complete in no more than 20 words)

Email your entry to **3dw.competition@futurenet.co.uk** with 'ZBrush competition' in the subject line. Please remember to include your full name, address and telephone number so we can contact you if you win. The four best entries will be selected on 12 January 2006, and those four *3D World* readers will receive a full, boxed copy of *ZBrush 2*, usually priced at £268* / $489 / €399* (*currency conversion).

For more information on the program, or to download the demo version of *ZBrush 2*, visit **www.zbrush.com**. To view the stunning work being created with *ZBrush* by other users around the globe, head to **www.zbrushcentral.com**. All things Pixologic can be found at **http://pixologic.com**

Q&A

SOLUTIONS / FIXES / ADVICE

Parsed

**QUESTION OF

THE MONTH**
Submitted by David, via email

how can I splatter Blood on a wall with 3ds max?

3DS MAX

FACTFILE

FOR
3ds Max 7 or later

DIFFICULTY
Expert

TIME TAKEN
One hour

ON THE CD
- Initial and finished 3ds Max files
- Adapted 3ds Max file and environment maps
- Full-sized screenshots
- Final animation

ALSO REQUIRED
N/A

Pete Draper is the VFX Director at Lightworx in Bristol. Despite what you see above, he's actually a nice chap and keeps bunny rabbits, several of which are still alive

Spattering virtual blood on a wall using *3ds Max* is tricky, largely due to the type of distribution pattern this effect produces. Forensic blood dispersion patterns may be gruesome, but they're essential viewing if we're to understand this phenomenon. For example, high-velocity spatter from a gunshot results in a fine mist and leaves small directional droplet trails on surfaces. Arterial or cast-off patterns create larger pools and directional trails.

In this Q&A, we're going to simulate a high-velocity effect, with some medium-velocity spatter to create interesting trails around the main emission point, and a few smaller-sized trails from the centre. Our aim is to produce a mask animation (a black-and-white image sequence) that we can use to create the finished effect: either by applying a suitable material to the blood within *Max*, or by colouring and layering the masks over a live backplate in a compositing app.

Because we're dealing with flat surfaces, this method will work fine. However, if you want the blood to interact with more complex surfaces, you would need to introduce additional deflectors, apply a blood material directly to the particle system and render it off in a single pass, either directly onto the CG scene or on a proxy scene to be composited.

GORY DETAIL

For effective blood distribution, we'll use multiple birth events within the particle system for different sizes of spray groups, which will be emitted using greyscale maps to drive the emission points and velocities of the particles. This will result in a nice pattern instead of the uniform spray we would achieve with a basic emitter.

To crank up the number of particles and create clumps, we'll spawn additional particles of the same size with a small divergence. Upon impact with the surface, particles will be made renderable and tested for size, with the larger ones passed to another event to generate trails down the wall. As large droplets fall faster than small ones, we'll use a basic Script operator to drive a Force operator's influence value, derived from the particles' Scale. We'll also add materials to the system: an opaque self-illuminated white for all the main particles, and a dynamic material, creating a reduction in opacity for the trails as the main droplet travels down the wall.

064 | 3D WORLD December 2005

STAGE ONE | Initial scene and particle emitter set-up
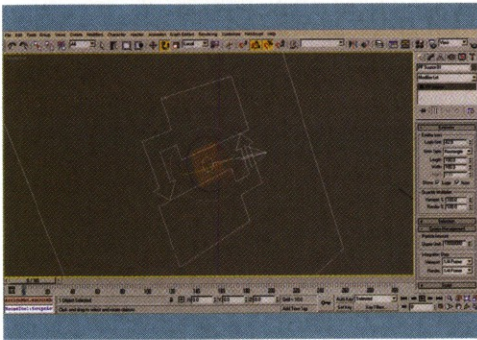
01 Open 'blood_spatter_start.max' from the CD. This is our basic scene, with two instanced plane primitives (one for the emitter and one for controlling speed), and a deflector for our blood particles to interact with. The Particle Flow source is positioned to give a visible indication of the particle direction, and has initial parameters already set up for Integration step and particle upper limit amounts.
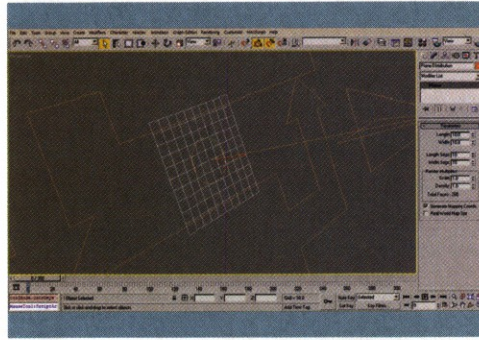

02 We're using plane primitives for the emission and speed, because we can add extra control by assigning greyscale materials to them to vary the particle and speed distribution. However, we'll need to add extra variation to the distribution, which can be applied by subtly displacing the surfaces to increase any divergence occurring once we've set up particle system speeds.
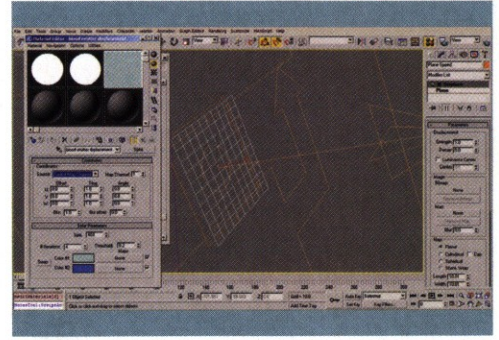

03 Select the Plane Speed object, add a Displace modifier and set the Strength to 1. Next, create a map to displace this surface and its instanced copy (the emitter plane). Open the Material Editor and create a Splat map in the first free material slot. Label this 'Blood Emitter Displacement'. Now set the Source mapping to Explicit Map Channel.
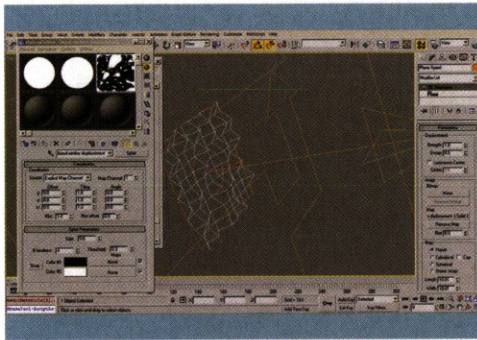

04 In the Splat Parameters rollout, set the Size to 0.6 and amend the Threshold to 0.3, so that we get some large and small splotches. Next, set the Colour 1 slot to black and Colour 2 to white. Instance this map to the Displace modifier's Map slot to displace the Plane geometry.
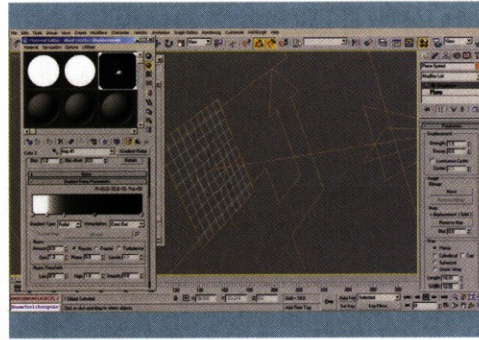

05 The result is reasonable, but we want the displacement to be smoother in the middle for a stronger displacement at the centre and a reduction around the edges. To achieve this, add a Gradient Ramp map to the Colour 2 slot of the Splat map, set the Gradient Type to Radial and design the gradient as illustrated in the screenshot above using Ease Out Interpolation.
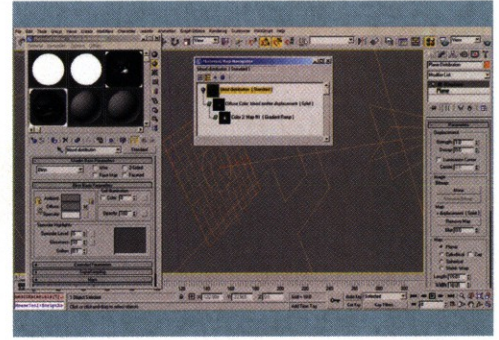
06 The particle system will use the plane material's greyscale information to control speed and particle emitter distribution. In the Material Editor, label a new material 'Blood Distribution' and assign it to the Plane Distribution object. Instance the Blood Emitter Displacement map to the Diffuse slot of this material so the particles are emitted at the extremities of the displacement.
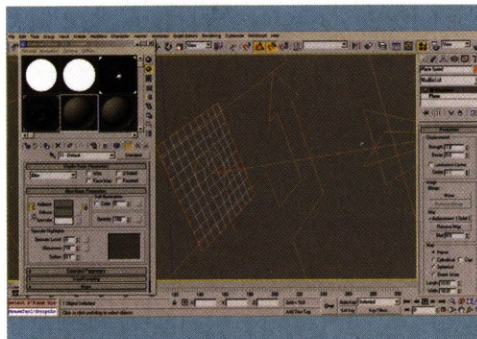
07 Time to set up a material to control particle speed. Because we want the particles in the centre of the emitter to travel faster, we can blend the Splat map tree (already generated) with an additional gradient map. The centre of the gradient will be white, then it will fade to the Splat map, then to black, producing a good variation of speed intensity (the greatest being around the bullet exit point).
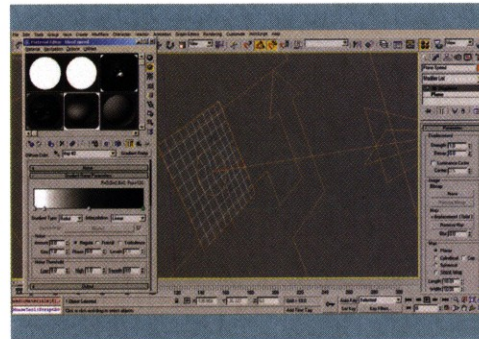
08 Label a new material 'Blood Speed' and assign it to the Plane Speed object in the scene. In the Diffuse slot, create a new Gradient Ramp map and set its gradient type to Radial. Design the gradient as illustrated, so that we end up with a solid white centre which then fades off to a grey of approximately RGB 60, 60, 60 at position 50, and then to black at position 100.
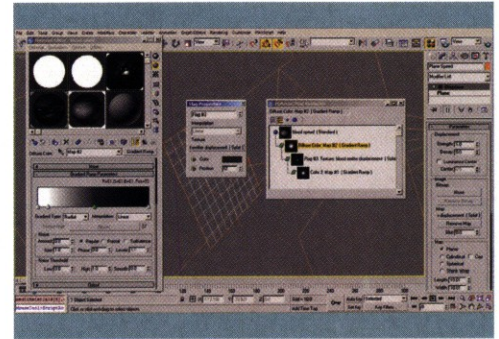
09 Next, we need to inset the Splat map into the gradient so that it fades from white to the Splat map and then to black. Right-click the flag at position 50 and select Edit Properties. Instance the Blood Emitter Displacement map to the Texture map slot in the Gradient Ramp flag's Edit Properties panel. Finally, close the panel when this process is complete.

STAGE TWO | Creating the Force Space Warps
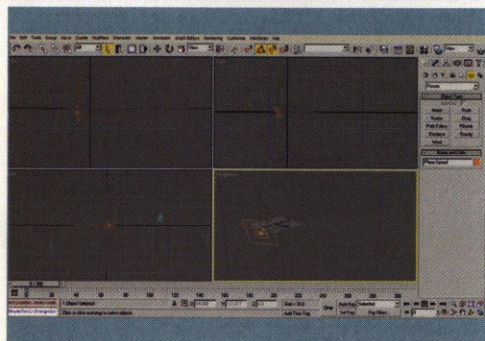
10 To get the particles to distribute nicely as they fly through the air, and as they travel down the wall in an erratic fashion (try running water droplets down a vertical surface to see the effect in real life), you need to add Force Space Warps to the scene, namely Gravity (to get the particles to fall), Wind (to get them to create erratic patterns) and Drag (to control the trail motion).
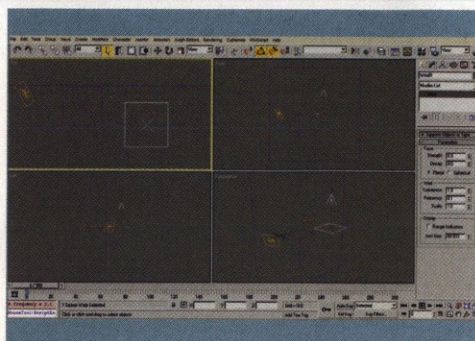
11 In the Top Viewport, create a Gravity Space Warp and set its Strength value to 0.5. This will be used in the initial emitter particles' motion, so they spread further down the wall if their velocity isn't that high. Create a Wind Space Warp in the same Viewport. Set Strength to 0 so there isn't any directional force influence. Set Turbulence to 1 and Frequency to 0.1 for a varied motion.

12 Later on, these Space Warps will be controlled with a MAXScript derived from particle scale. As these Space Warps (combined) will create large rate changes in velocity and direction, we'll keep them under control with a Drag Space Warp. Create one in the Top Vi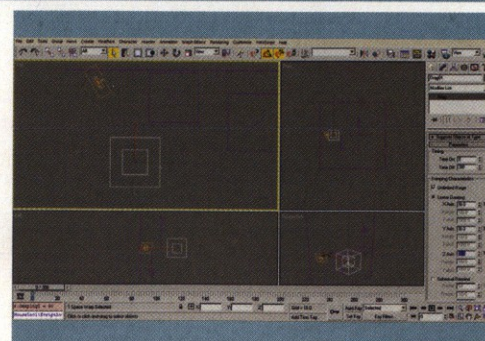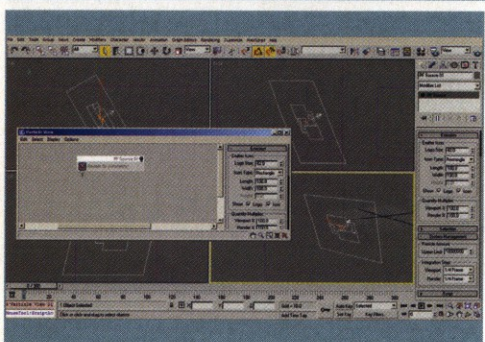ewport, then change its Time Off setting to 300 (the length of the sequence) and set the Linear Damping X, Y and Z Axis values to 90 per cent.

STAGE THREE | Creating the particle system

13 Next, go into Particle View and start designing the initial system. Because we're using Spawn tests, we should disable the system until the particles exit from the birth event(s), because if we scrub through the animation, we may experience lags or crashes due to spawned particles spawning more particles. Press [6] to open Particle View and turn off the PF Source 01 root event.
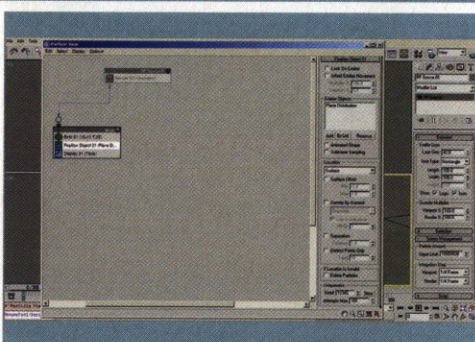
14 Add a new Birth operator to the canvas to create a new event. Label the event 'Large' and wire it to the output of the PF Source 01 event. In the Birth operator, set the Emit Start to 10 and Emit Stop to 11 so we get a burst of particles, then set the Amount to 30. Add a Position Object operator to the event and add the Plane Distribution object to its Emitter Objects list.
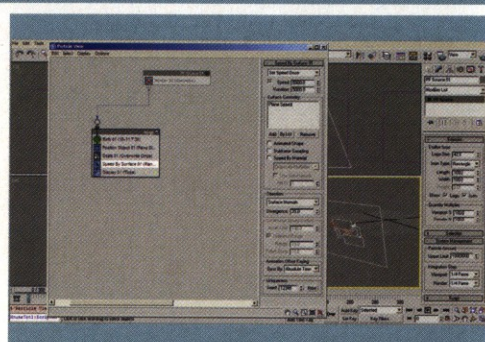
15 Enable Density by Material so that the particles are scattered over the object accordingly at birth. Next, add a Scale operator and set its Scale Factor to 200 and a Variation to 75 for all axes. Add a Speed By Surface operator, set the Speed and Variation to 5,000 and add the Plane Speed object to the Surface Geometry list. Enable Speed By Material and set the Divergence to 25.
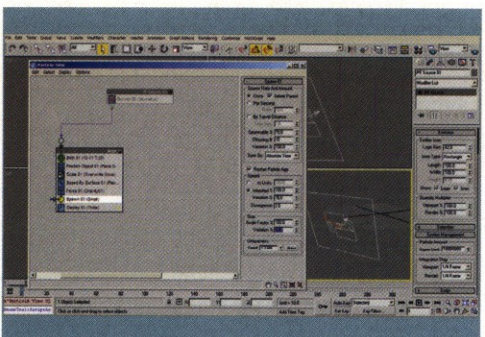
16 Add a Force operator, then add the Gravity Space Warp to it. This will cause the particles to fall down as they travel to the wall. Add a Spawn test to the event and enable Delete Parent. Set the Spawnable % to 70, Offspring to 10 and Variation to 100 to generate a clump of particles. Set the Speed Variation to 75 with a Divergence of 3 for a small-sized clump. Set the Scale Variation to 75.
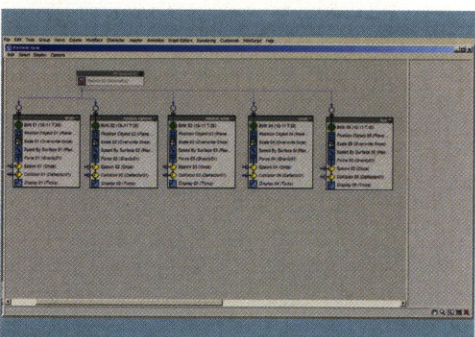
17 Finally, add a Collision test and add the Deflector to its list. Set the Collides Speed to Stop so that the particles remain on the Deflector on collision. Instance this event four times and wire each one to the root event. Make each Birth, Scale, Speed By Surface and Spawn operator unique, then label the events 'Medium Narrow', 'Medium Wide', 'Small' and 'Fine'.
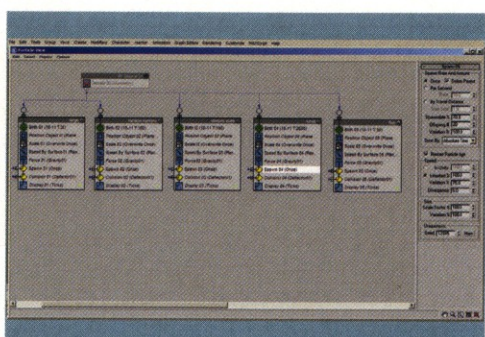
18 In the Medium Narrow Birth operator, enter: Amount 100, the Scale operator's Scale Factor 125%, Speed 10000 (2500 Variation, 30 Divergence). Do the same for Medium Wide, but set Divergence to 50. For the Small event: Amount 2,000, Scale 70 (50 Variation), Speed 20000 (5000 Variation, 40 Divergence). In its Spawn test: Offspring 20, Speed Divergence 5 and Scale Variation 100.

STAGE THREE (Continued) | Creating the particle system
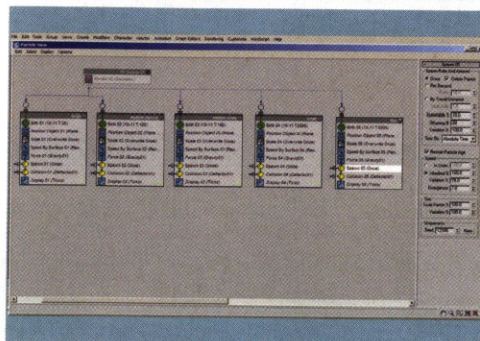
19 In the Fine event, set the Birth Amount to 5000, Scale Factor to 45 with 50 Variation, Speed to 40000 with 10000 Variation and Divergence to 50. In the Spawn test, set the Offspring to 20 with a Speed Divergence of 7 and Scale Variation of 100. These settings ensure that the finer the particles, the wider the angle of distribution, producing a wide clumping area.
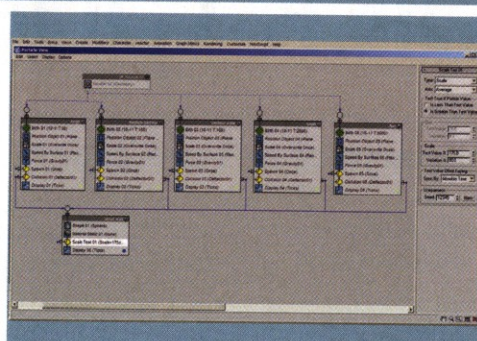
20 Add a Shape operator to the canvas to create a new event, wire the output of all Collision tests to the input of this event and label the event 'Blood Wall'. Set the Shape operator's Shape to Sphere and Size to 0.5. Add a Material Static operator to the event and a Scale Test. Set the Scale Test's Test Value to 175 with a Variation of 50 so that only particles greater than this will create trails.
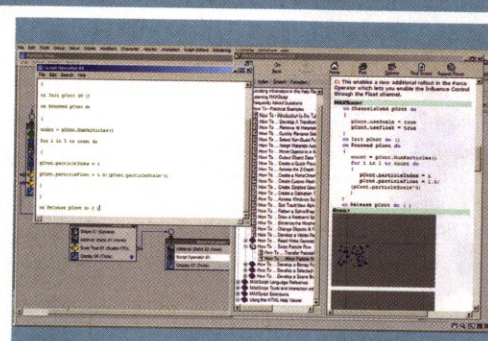
21 Instance the Material Static operator to the canvas to create a new event, wire it to the output of the Scale test and label it Blood Trail Parent. Add a Script operator and click on the Edit Script button. Open *3ds Max's* MAXScript reference, then copy and paste the 'How To Affect Particle Flow Particles by Mass' script, overwriting the existing script (the explanation of what this script does is found in the MAXScript tutorial documentation).

22 Next, navigate to the pCont.particleFloat = 1.0/(pCont.particleScale^3) line and edit it to read pCont.particleFloat = pCont.particleScale^3, so that larger particles are affected more than small ones. Now close the script. Add another Force operator, then add the Gravity and Wind Space Warps as before. Right-click the operator and enable Use Script Wiring so that the Float channel data can be used within this operator.

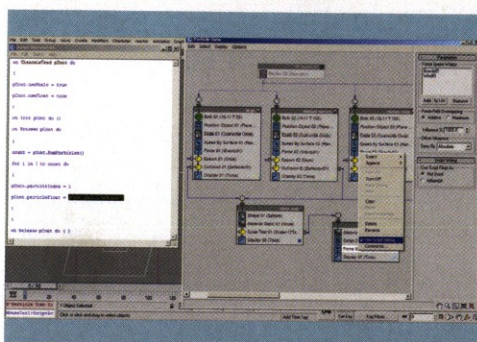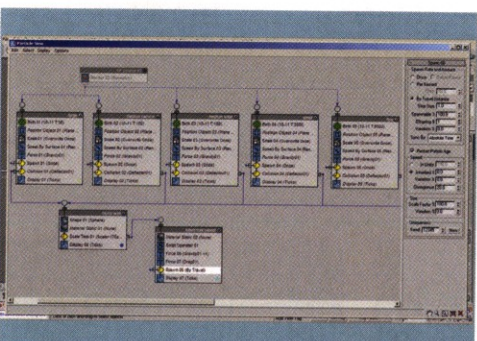**23** In the Force operator, enable 'Use Script Float as Influence', so the Float channel data drives the influence of the Gravity and Wind Space Warps, producing stronger gravity and turbulent motion the higher the particle's scale is set. Add a Force operator, add the Drag Space Warp to it and set its Influence to 2000. Add a Spawn test set to By Travel Distance and set Inherited Speed to 0.
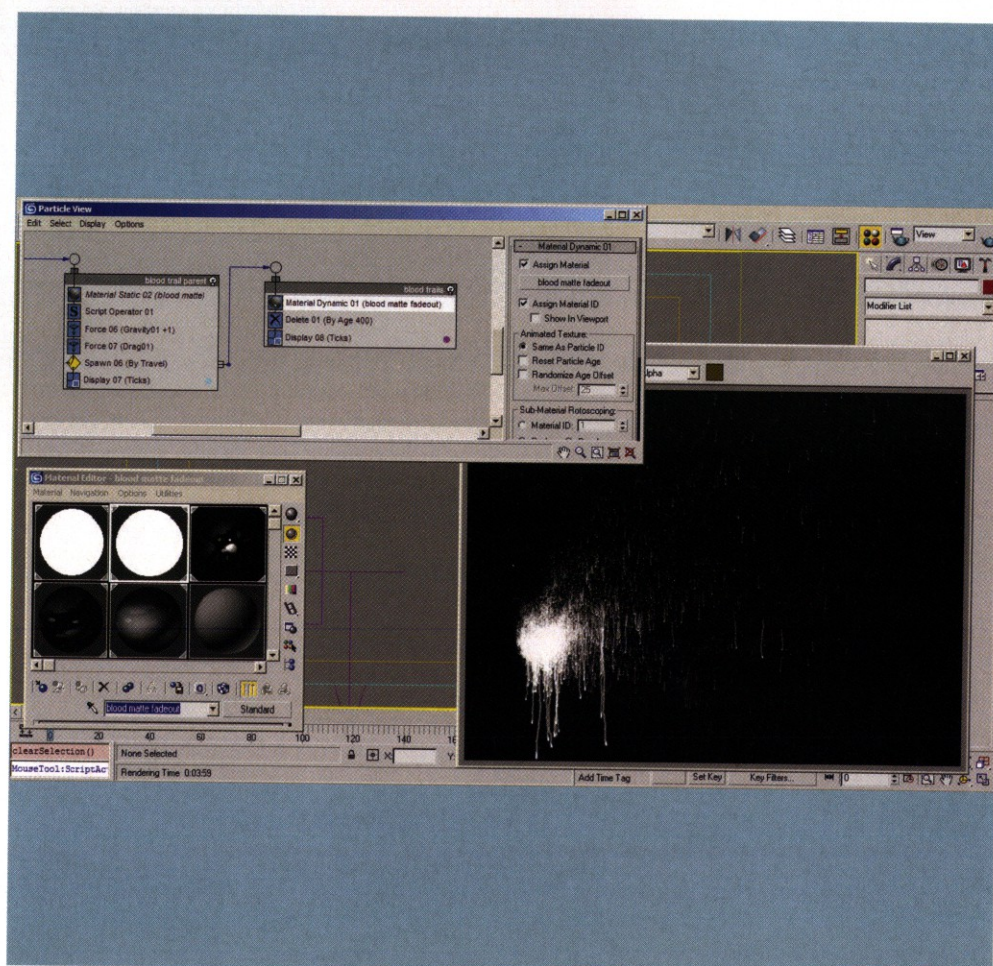
24 Add a Material Dynamic operator to the canvas, wire it to the output of the Spawn test and rename the event 'Blood Trails'. Open the Material Editor and instance the Blood Matte Fadeout material to the Material Dynamic operator and the Blood Matte material to either instanced Material Static operator. Add a Delete operator, set it to By Particle Age and the Life Span to 400 and 0 Variation, so the Particle Age map in the assigned material works. Now enable the system. Once the final mask sequence has been rendered out in the Front Viewport, it can be overlaid on the background scene. In blood_spatter_takenfurther.max on the CD, we've applied a suitable blood material to the spatter mask, and dropped it onto a live backplate, but you could achieve the same effect in a compositing package. ●

Quick Questions

No matter which 3D software package you use, our experts are here to help. Send us your query and we'll provide the solution: **http://forum.3dworldmag.com**

Q&A
Our experts this month ...

AFTER EFFECTS PRO
Chris Kenworthy lives in Australia and works in postproduction. He's also a writer and director
http://homepage.mac.com/thoughtfox/index.html

ANIMATION:MASTER
Shaun Freeman was a teacher for 10 years, and now works as an animator at 3Dworks Animation Studios in Melbourne, Australia
www.3dworks.com.au

CINEMA 4D
Adam Watkins is the Director of Computer Graphic Arts at the University of the Incarnate Word in San Antonio, TX
www.cgauiw.com

DAZ STUDIO
Laurie Stanley is a content developer, CG artist and product coordinator for the Platinum Club at DAZ Productions
www.daz3d.com

LIGHTWAVE 3D
Benjamin Smith, the industry's Buzz LightWave, has been travelling at a constant velocity ever since he can remember
www.redstarstudio.co.uk

MAYA
Gary Noden is Head of 3D at 422 Manchester and is starting to see spots before his eyes. Some people might call him dotty
www.422manchester.com

RHINO
Neil Rennison is a freelance 3D artist. He has recently been seen creating artwork for a number of handheld console games
www.neilrennison.co.uk

SOFTIMAGE XSI
Ola Madsen works as a 3D artist for a company in Sweden, animating everything from medical treatments to cute teddy bears
www.digitalcontext.se

VUE 5 ESPRIT
Eran Dinur is a freelance 3D artist and animator. He's created sample scenes for *Vue 5 Esprit*, *Vue 5 Infinite* and more
www.e-onsoftware.com

● In this render, texture maps have been combined with detailed displacement, specular and bump maps, shaders, five Point lights and two Spot lights. See it in full detail on the CD

ON THE CD
● Scene files and screenshots for all the Q&As
PAGE 115

Q&ATIP
● When a displacement map is unavailable, there is a solution: a bump map can be used instead in the displacement channel

DAZ STUDIO | 16-bit displacement maps

Q Why use 16-bit displacement? Will this result in a more realistic render? **MACLEAN, VIA THE DAZ STUDIO FORUM**

A Displacement mapping is a powerful technique for adding detail to 3D objects. While bump mapping only gives the appearance of increased surface geometry, displacement mapping actually moves or 'displaces' the underlying polygons.

Displacement created using a 16-bit map will result in a smoother mesh graduation than an 8-bit map. Sometimes referred to as '64-bit colour', since each RGB and alpha channel contains 16 bits of information, 16-bit maps can contain up to 65,536 shades of grey (and therefore levels of height in the render). An 8-bit map only allows 256 levels of height, often resulting in a grainy-looking displacement.

DAZ Studio supports 16-bit maps. The first image below compares 8-bit and 16-bit displacement – note how 16-bit results in smooth height graduation. Load '3DW_bitdisplacement' into the application from the *3D World* CD to take a closer look.

While 16-bit displacement will add to realism in some cases, it's not always necessary. Although a 16-bit map may be preferable for surface architecture and detail, an 8-bit map is adequate for rougher surfaces such as brick. Using the right amount of displacement is also important – load '3DW_displacement' and vary the amount of minimum and maximum displacement. Increasing the amount will distort the mesh.

Combining texture maps with detailed displacement, specular and bump maps, plus shaders, will also add realism to a render, as illustrated in the image above (see '3DW_displacement2' on the CD). **[LS]**
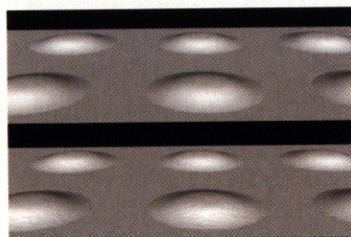
● A 16-bit displacement (top) compared to an 8-bit displacement (bottom). 16-bit is smoother
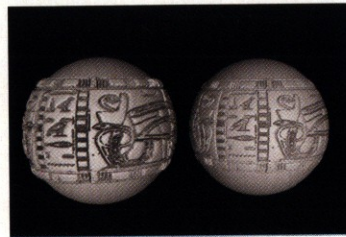
● *DAZ Studio* measures displacement in centimetres. Here it is at +2.0cm and +0.5cm

● Combining texture maps and shaders with displacement will add realism to your renders

ANIMATION:MASTER | When I alter Reflectivity, 0% shows none and 1% is like a mirror!
MIKE DALTON, VIA THE FORUMS
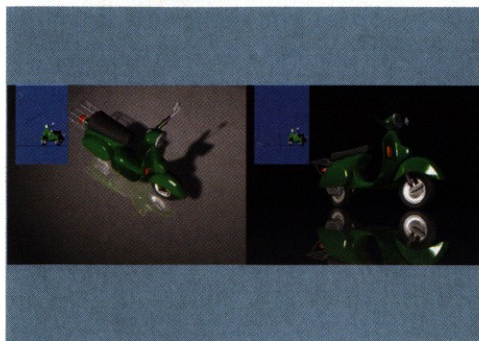
01 Change the angle of the camera
There are a number of ways of dealing with this issue in *Animation:Master*. The simplest solution is to adjust the angle of the camera to the ground. The higher the camera is (that is, the greater the angle), the less reflective; the lower the camera (the smaller the angle), the more reflective. This is called the Fresnel effect, and it's most obvious at angles less than 10 degrees from the surface. The above images demonstrate extreme examples.

02 Use soft reflections by adjusting specularity
Another possibility is to turn on the Soft Reflections render option. This effect can be altered to increase or decrease the width of soft reflections by entering different values in the Specular Size option (found in the reflective object's Surface Properties in the Project Workspace). The groundplane in this case has a Reflectivity of 35%, and a Specular Size of 0% and 50% respectively in the images shown above.
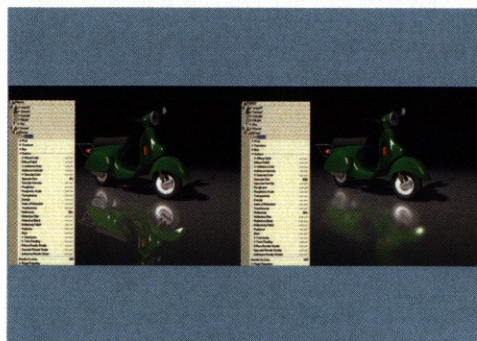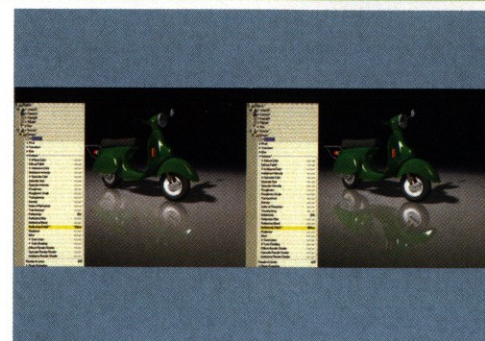
03 Adjust Reflectivity Falloff
A third option is to alter the Reflective Falloff. Falloff is the distance from the camera to the area in which the reflection is no longer visible. The higher the Reflective Falloff, the more an object's reflection is visible; the lower the falloff, the less reflection is visible. [SF]

LIGHTWAVE 3D | Managing the speed of motion paths

Q How can I make an object travel down a motion path at a constant speed?
HYPERIIT, VIA THE FORUMS

A This is something that's surprisingly hard to do in *LightWave*, given that most motion paths have been made via hand-keyframing, rather than moving the object along a modelled curve. There are two good techniques: a manual one and one that's semi-automatic.

The manual technique involves adjusting the timing of the keyframes: turn on Motion Paths in the Display panel so each frame is a tick. You can see areas of slower or faster motion from how closely the ticks are bunched on the path. More usefully, apply the *Speedometer* plug-in to the object via the Geometry tab of the Properties panel. This draws a little speedometer that will show you the object's speed at the current frame.

In the Graph Editor, bring up the Position channels, right-click any of them and choose Show Speed, which will draw a

THE SPEEDOMETER PLUG-IN SHOWS YOU THE OBJECT'S SPEED

brown line representing the overall speed. Now move the X, Y and Z position keys in the Graph Editor to smooth out the timing.

Depending on the complexity of your motion path and how accurately you want the speed to become linear, you may admit defeat and prefer to take a more automatic route. Select your object and go to File > Save > Save Motion Path. In Modeler, create a single vertex and, from the Multiply tab, choose Extend (more) > Motion Path Extrude. Select the path. Now, from the panel, set the Step value to something greater than 1. This presents you with a row of points that you can use to make a curve. Create another point in another layer and rail extrude it down the first curve using Uniform Lengths or Knots, which will space the points at uniform distances. Select the new curve, go to File > Export > PathToMotion and reload the motion for the object in Layout. [BS]
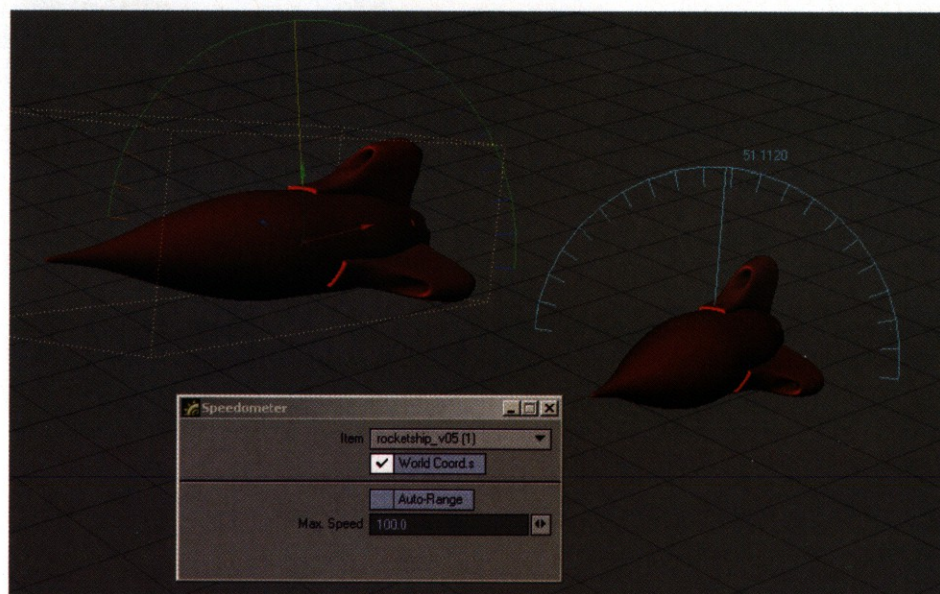
● The *Speedometer* plug-in draws a handy speedo on the screen. You can set the top speed via its panel

Q&ATIP
● Instead of reloading a motion path, delete the motion and move it with the *CurveConstraint* plug-in through the Motion panel, referencing the curve saved in Modeler

● Two rockets travel on motion paths. The rocket on the right has had its path recreated via the Modeler technique we've outlined

RHINO | Modelling a realistic shell

Q **How can I model a convincing shell shape?**
DANIEL STEVENS, VIA EMAIL

A Modelling anything based on nature is always a challenge, and ironically these types of shapes need to be approached from a mathematical viewpoint. Snail shells are essentially made up from logarithmic (or equiangu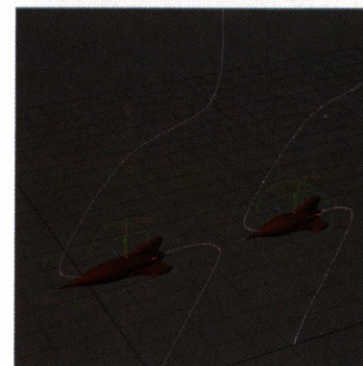lar) spirals. You can do a search on the Internet and find many wonderful mathematical sites devoted to them. Unfortunately, *Rhino* doesn't support the direct creation of these kinds of shapes.

All is not lost, however: there's a useful technique available. The steps are too lengthy to print here, but you'll find them at www.renderosity.com/messages.ez?ForumID=12371&Form.ShowMessage=1973815 (become a member for free to be able

BUILD A DOME SHAPE AND PROJECT A SPIRAL ONTO ITS SURFACE

to view them). The steps have also been repeated in the accompanying file on the CD, and contain the final spiral.

Once the spiral creation technique has been mastered, it's possible to change the degree or tightness of the spiral by modifying the original arcs. As this curve will be used as a sweep path, changing the design would ensure that a multitude of shell designs could be achieved. Next, the spiral needs to be made three-dimensional, so the best technique is to build a domed surface and then project the spiral on top of it. Again, different surface designs will yield different ways in which the curve spirals downwards, thus changing the shell design.

This final curve can be used as the path on which to build the shell shape, creating a number of cross-sections perpendicular along the curve. Now simply make the cross-sections slightly misshapen (see Tip) for added realism. If speed is of the essence, try using the Pipe command found in the program's Solid menu. This gives you the ability to add thickness to the shell. A piped version is available in the accompanying *Rhino* file on this issue's CD. **[NR]**
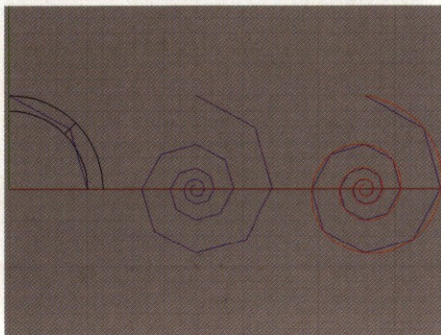
● To create a good sweep path for your shell, you must first create a logarithmic spiral

Q&ATIP

● When sweeping, alter the shape of the circular cross-section to make the shell more seashell-like. Create a circle, rebuild it with more points and edit it from here
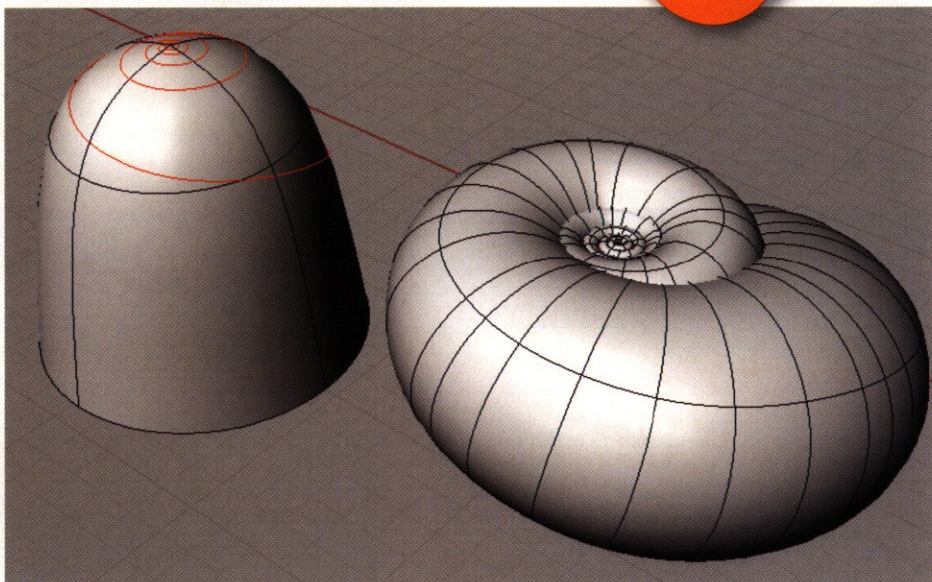
● Here, the spiral has been projected onto a dome shape. Next, the Pipe command has been used on the final spiral curve to generate the shell surfaces. It's an effective technique for modelling these kinds of forms within *Rhino*

CINEMA 4D | Do I need special shaders to create the texture of a soft-drinks can?
MATTHEW FOX, VIA EMAIL

01 **Creating a realistic look**
Believable surfaces are partly about the materials and their channel values, but largely about lighting. In the case of cans, you're dealing with a smooth surface. It has three characteristics that you can define with a material: colour, reflection and specular. Ultimately, the geometry is quite simple, and as long as you have good curved surfaces, this technique will work.

02 **Adding reflections**
Create your material with a simple colour map to define what kind of drink is in the can. Activate the reflection channel, but not the specular channel. A specular highlight is just an approximation of reflection. If you have the appropriate lighting sources, or reflective surfaces (such as HDRI), the specular highlights will take care of themselves. This rendering uses a HDRI image on a Sky object.

03 **Using HDRI**
You can use radiosity (Global Illumination) to create a variety of lighting schemes, or render with regular raytracing and define your own light sources, intensities and directions. As long as you have a HDRI as a sky (to reflect), the reflection will make the can texture more believable. To further accentuate the render, add geometry for water droplets, which will also reflect the HDRI. **[AW]**

## SOFTIMAGE XSI | How do I animate steam coming from a cup of hot water?

MATT, VIA EMAIL

01 **Creating the particles**
Open coffee.scn from the CD. Press [4] to switch to the Simulate panel, and from the Create > Particles menu, choose From Disc. Under the PEmitter_emission tab, change the Rate to 25 and Variation (Var) to 5. Lower the Speed to 2 and the set Variation to 0.5. Select the PEmitter and position it below the coffee surface inside the cup.
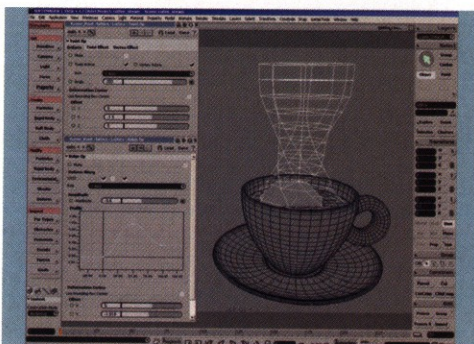

02 **Connecting the sprite**
Press [Enter] to open its PPG and increase the Outer Radius to 4. Select the cloud again. From the Inspect > Par Types menu, choose PType to open the PPG. Go to the Sprite tab, click New and pick the steam_sprite.pic image from the CD. Scroll down to the Particle Billboard section and go to the Make Connections tab. Click the Sprite button.
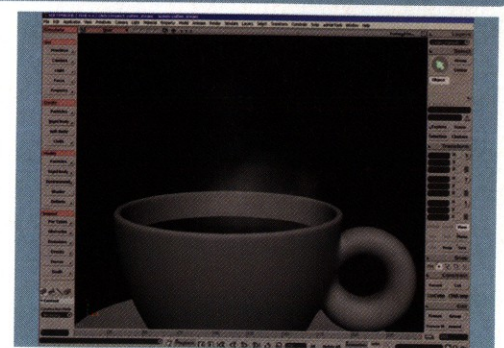
03 **Adjusting the steam**
Scroll back to the PType Overview tab and change the Max Life Var to 1.5. You want to make the sprites larger, so increase Size to 8 and set Var to 2. In the Color section under the Overview tab, change the colour to pure white. The particles are still a bit too abrupt; to fix this, you can animate their Alpha (transparency) over time.
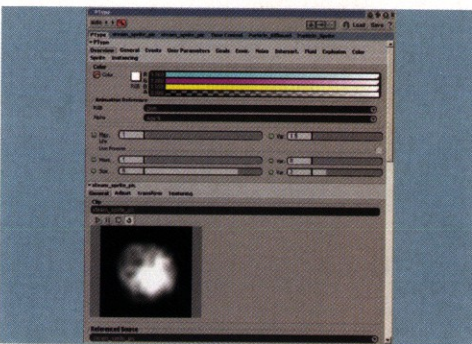
04 **Fading the steam**
Go to frame 1. Still in the Color section, lower the Alpha value to 0 (zero) and click the Animation icon (green dot) for the Color to set a keyframe. Go to frame 50, increase the Alpha value to 0.75 and set a new keyframe. At frame 100, lower the Alpha to 0 again and set another keyframe. Now, under the Animation Reference section, change the Alpha from Birth to Age %.

Q&A TIP
● Click the Camera icon, set Background to black and switch the Viewport's Display Type to Textured Decal. This enables you to see your particles more easily

05 **Forming the steam**
From the Get > Primitive menu, pick Lattice and align the bottom to just above the coffee surface. In the PPG, set the Y Subdivisions to 10 and the Pre-Deformed Size of the Y-axis to 10. Click Modify > Deform > Bulge and set the Amplitude to -0.6 and the Offset along the Y-axis to -1. The steam will be narrow, spreading out as it ascends.

06 **Adding a twist**
So now we've managed to achieve the change in shape and size that we were after. Finally, add a slight swirling effect to the hot steam as it's rising up through the air, just to get a bit more realism. With the Lattice still selected, choose Modify > Deform > Twist. Change the Deformation Axis to Y and set the angle to about 200. Also, change the offset for the Y-axis to about -1.5. Now you only have to connect the particles to the Lattice and you should successfully have mimicked some of the basic forces without actually using any! To finish up, select the Cloud and, from the Modify > Deform menu, choose Lattice and pick the Lattice. Finally, just play back your coffee-cup animation and enjoy your brew. [OM]
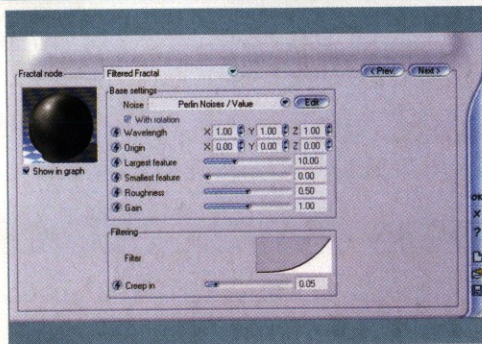
## VUE 5 ESPRIT | How can I create a highly detailed Himalayan-style mountain range?   ROBERTO G, VIA EMAIL

01 Create a filtered terrain
First, create a procedural terrain, open the Terrain Editor and uncheck Zero Edges. In the Procedural tab, [Ctrl]-click the Altitude Production swatch to open the Function Editor. Select the Altitude function node and change the Fractal Type from Simple Fractal to Filtered Fractal. Double-click on the Filter swatch and load the Young Mountain profile from the Terrains collection.
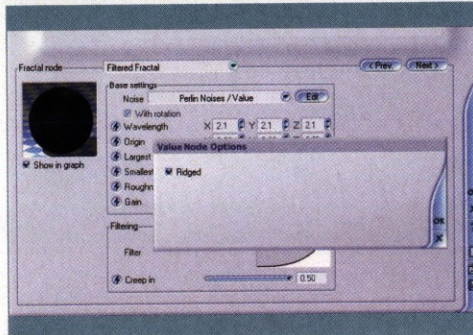
02 Fine-tune the function
Raise the filter Creep-In value to 0.50. Click the Edit button next to the Noise type and check the Ridged option. Raise Wavelength to 2.1 for all axes. Click OK to close the editors. Re-scale the terrain to about 20 times its original size and move the camera up above the terrain's surface (since procedural terrains have infinite detail, you can get very close to the surface without seeing any polygon edges).
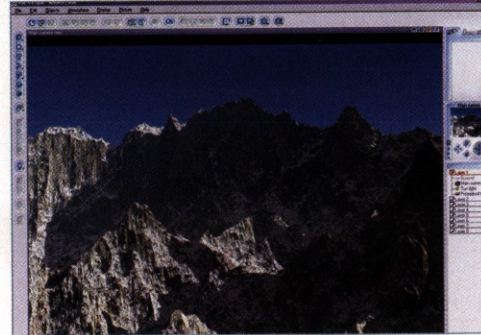
03 Add a material
Create a mixed material of dark rock and snow (make the snow material about 10 per cent luminous). Set the Influence of Slope to 100 per cent (snow on flat surfaces), and Mixing Proportions to about 38 per cent rock. Now you can go on and shape the terrain even more by editing and refining the filter curve, changing wavelength or tweaking the roughness value. [ED]

AFTER EFFECTS PRO | Wrap light around a figure with Keylight

Q How do I wrap light around the edges of a composited figure? DAVID CLARKE, VIA EMAIL

A When you film a real person in front of a real background, some of that background light wraps around them. Good cinematographers make use of this, effectively drawing a shiny light on a person's hair and shoulders. When doing chroma key work, you'll attempt to light in this way to help pull the matte, using light to take away blue glow from the shoulders and hair.

Unfortunately, this means that chroma key lighting is usually colourless. No matter how well you light the shoot, the glow will not be the same colour as the plate you're going to composite in the background. For a composition to work, you need to wrap light around your foreground figure in *After Effects*. Keying

USE KEYLIGHT'S FEATURES TO CREATE A LIGHT WRAP FILTER

filters such as Keylight have their own way of adding this wrapped light, but many users find they desire more control over the look. You can buy plug-ins such as *Composite Wizard* to add a light wrap to your footage, or you can use Keylight's hidden features to create a custom-made light wrap filter.

This solution requires no extra keying, but takes advantage of the background colours. When you've almost finished the keying work, duplicate the composition. In one of the compositions, set Keylight's View drop-down to Colour Correction Edges. This will render a white line around the edge of your foreground figure. To give it the colour of the background, change the Blending mode to Darken.

Drop this onto the other composition and set the Blending mode to Add. To make the light look as though it's coming from the background, put one copy behind the foreground figure and one in front. Set both to Add and you can toggle Opacity. It's also worth adding Gaussian Blur, or changing the Scale slightly. In most cases adding a blur is enough, making this a fast way to add a glow that accurately reflects the background colours. [CK]

Q&ATIP
● When you think the effect is perfect, reduce the Edge Opacity setting by 10 per cent, then render. In most cases, slightly less is better than more

● If you've done your keying work well, a change of settings produces an outline of coloured light, which can then be wrapped around your foreground figure

● The final result may be subtle, but it makes a huge difference to the success of a composited shot, adding a valuable hint of realism
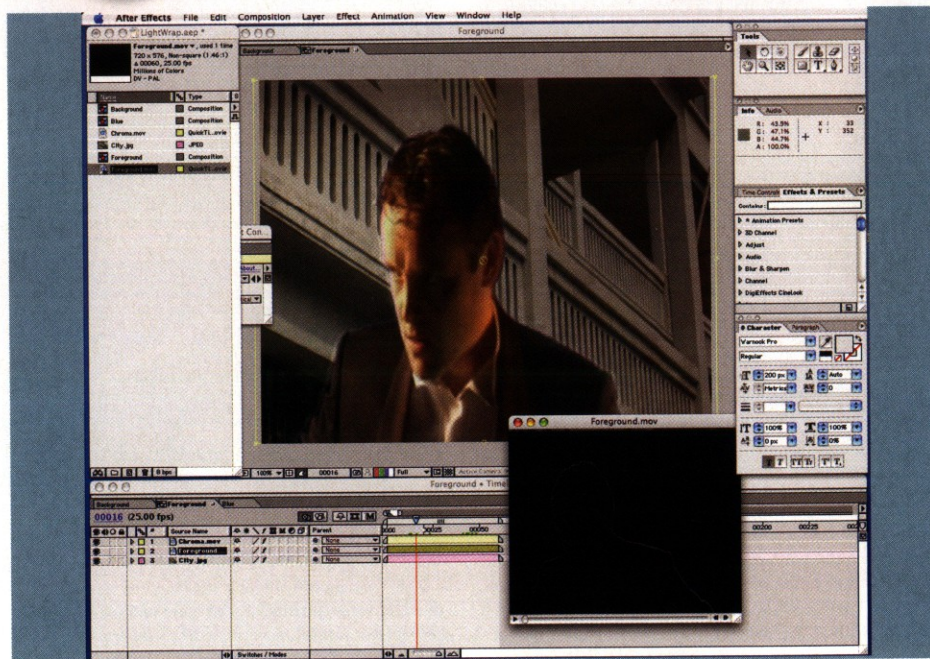
MAYA | Create words from particles using Particle Cache

Q How do I replicate dust particles moving in a beam of light to form a word? **JODEE, VIA EMAIL**

A Particles are magnificent – unless, that is, you want to form a word with them. The fact is, you can't do it. You can, however, emit particles to replicate a texture map of a word and mess it up with Turbulence. This is fine if you then reverse the order of your images in a compositing package such as *After Effects*, but what about inside *Maya*? Well, thanks to the power of the Particle Cache, it is possible.

Make a square texture map of your word, white on black. Now create a nurbsPlane in *Maya* and click Particles > Emit from

FOR THIS EFFECT, YOU NEED TO REVERSE TIME INSIDE MAYA...

Object. Set the End Time to 800 and the Emitter's Speed to 0. In the Attribute Editor of your emitter, scroll down until you find Texture Rate. Plug in your map here and click Enable Texture Rate so it's switched on. Play it back until you like your particles, then select Solvers > Initial State > Set for Selected. Save your scene and delete everything but your particles.

Reset your end time to 150. Now select the particleShape and assign a Turbulence field to blow it about, and a Drag field to minimise the overall movement. Twiddle the values until you achieve results you're pleased with.

Select your particle and click Solvers > Create Particle Disk Cache. Save your scene and delete your fields. Now open the Hypergraph. Select your particleShape and, in the Hypergraph, click Show Input and Output Connections. You should see a node called time1 plugged into the particleShape's currentTime attribute. Your Particle Cache uses this as the frame value for its animation. Disconnect it, but don't delete it. Now reverse time by keying 150 at frame 1 in the particles' CurrentTime and 1 at frame 150. **[GN]**

Q&A TIP
● This process can also be used to great effect with fluid dynamics to create words forming from smoke

● It's not the simplest task to carry out, but it can be done. Here's a bunch of particles, successfully spelling out the words *3D World*

● One big patch of turbulent particles. In the top corner, you can see the time connection joined to the particles in the Hypershade
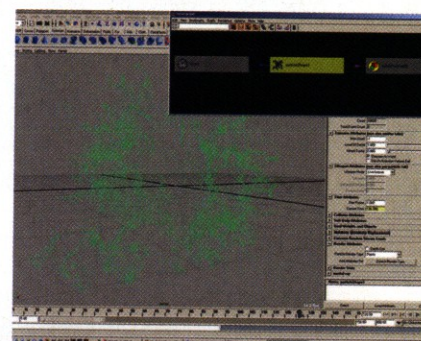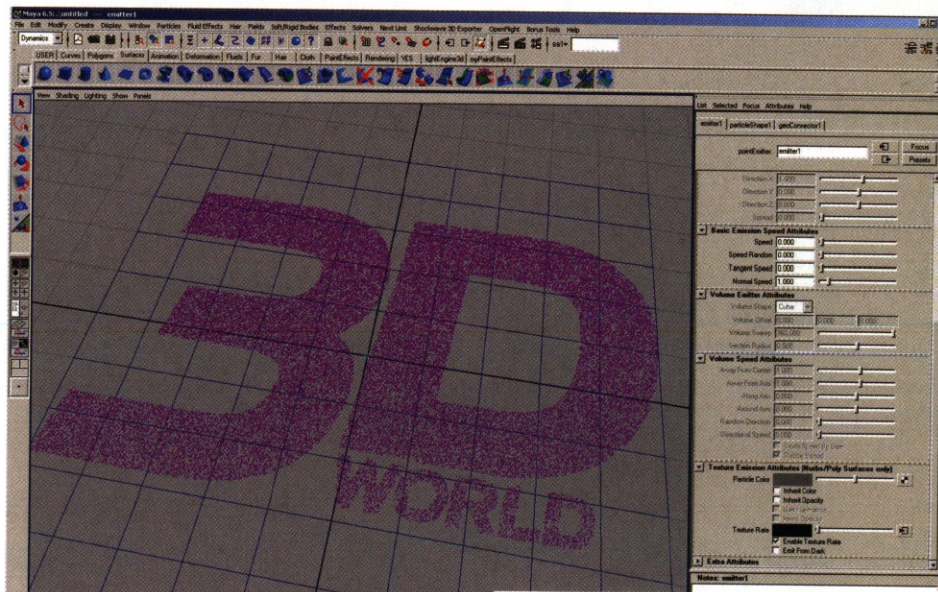
CONUNDRUM | Send us your solutions to this month's brainteaser

Each issue, we set you a real-world 3D problem to solve. The sender of the best solution wins the book shown on the right. Our conundrum for last month was posed by *Cinema 4D* user sribas, who asked:

"How can I have the shadow of a house projected in an invisible floor plan, so I can have the shadow projected in a background image? In other words: I have a background landscape picture and a 3D house, and I want the shadow of this house to be projected on this background image."

This month, the most complete solution was emailed in by Dave Kirkby, who snatched half an hour in his lunch break to write: "Create an object with the background picture applied as a texture, and a floor object to act as a shadow catcher. Next, set up the camera so the vanishing point and angles all line up properly. Group together the objects that need to be composited in (in this case, the house), and give them a Compositing Tag, Under Object Buffer, switch on the buffer and assign a number. Do the same thing to the floor object, but assign a different number ('1' and '2' are logical). Make sure that the background object will not show up when rendering.

"Now, under Render Settings, go to Multi-Pass and add all the passes needed: in this case, the basic Specular, Shadow and Diffuse. Now add the Object buffer twice and set the numbers required. Set the save path and render.

"Next, fire up *Photoshop* and import the render passes and background image. Make sure the background is below all of the other channels, then with the Diffuse layer selected, add a layer mask. Switch to Channels and select the channel with the house. Copy that channel and paste it into the layer mask. Switch off the visible mask and tweak the final image to your heart's content."

Congratulations to Dave: a copy of *Facial Expressions – A Visual Reference for Artists* is in the post to you now.

THIS MONTH'S QUESTION
Our question for issue 71 concerns *XSI*, and was sent in by Spencer Bailey, who asks:

"I'm animating a character with a tie. I need to get the tie into extreme shapes, but I don't want to have to key lots of individual bones. Is there an alternative set up that will still give smooth deformations?"

As usual, you can post your solutions in the Mag Related and Softimage-specific section of the forum, or email them to us at the address on the right. The sender of the best solution will win themselves a copy of Mark Simon's book.
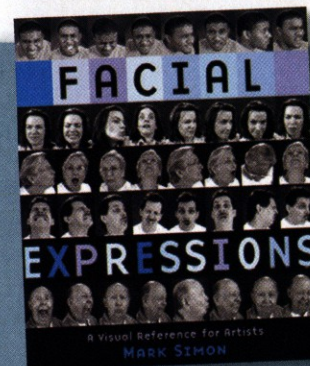
This month's prize

Send in your solution to this month's brainteaser and you could win a copy of *Facial Expressions – A Visual Reference for Artists* by Mark Simon. An invaluable aid for character animators, the book contains images of over 50 male and female models with ages ranging from 20 to 83, photographed in a variety of facial expressions and from multiple angles. For more information, visit **www.watsonguptill.com**

To enter, post your answers on our forum **http://forum.3dworldmag.com**

Contact us | You can also email your Q&A questions to 3dw.qanda@futurenet.co.uk

REVIEWS

HARDWARE / SOFTWARE / BUYER'S GUIDE

● Clockwise from centre: ATI's Radeon X800 XL, 3Dlabs' Wildcat Realizm 500, ATI's FireGL V5000, Nvidia's Quadro FX 1400 and GeForce 7800 GTX

YOU'LL BE PLEASANTLY SURPRISED BY OUR FINDINGS HERE: THEY REVEAL THAT EXPENSIVE DOESN'T NECESSARILY MEAN BETTER

Graphics cards

GROUP TEST Do you have to spend a fortune on a serious 3D card? The answer may surprise you. Cast your eye over five budget cards   **BY MAT BROOMFIELD**

We've reviewed many graphics cards, most of them targeted at the mid- to high-end 3D user. This issue, we wondered about the budget cards – how much value is there in less expensive ones? After all, games are among the most demanding 3D applications, and there are more home users than 3D professionals. In many ways, the games market is the engine for card development.

3Dlabs doesn't manufacture games cards, so it has no mass-market development to feed its workstation division, but the other key manufacturers – ATI and Nvidia – are both big in the games arena. With this in mind, we assembled five PCI Express graphics cards – three entry-level workstation cards and two games cards – to see what they were capable of. Our cut-off price was £550 excluding VAT (enthusiast games cards can cost as much).

We were looking to see whether these cards provide comparable (albeit scaled back) performance to their costlier rivals, or if they were fundamentally inferior in any way. We used the same bench-marking tools as we would for the pro cards, so you can see how they compare against the more expensive options reviewed in issue 63. We also downloaded the latest drivers and optimised each set for performance over quality, turning off features that might skew the results, such as antialiasing, vertical sync and filtering.

One of the arguments that has always been put forward for purchasing pro cards by the manufacturers is the fact that they go through a more rigorous testing and development process. They also include vendor-certified and WHQL-approved (Windows Hardware Quality Labs) drivers. These all result in a more stable and optimised work platform. Manufacturers may spend more time optimising drivers for their high-end products, particularly in terms of OpenGL support, but in all the years we've been testing graphics cards, provided we used non-beta drivers, we've never seen any difference in driver stability.

If you work with particular applications, or in particular parts of the industry, you'll be pleasantly surprised by our findings here: they reveal that expensive doesn't necessarily mean better.

> ## THIS ISSUE WE WONDERED ABOUT THE BUDGET CARDS – HOW MUCH VALUE IS THERE?

TALKING POINT | Seeing double with dual GPU

THE ABILITY TO connect two graphic cards together to increase your machine's rendering power, or the number of monitor outputs, is a promising technology. It requires specific drivers and software support as well as a compatible motherboard and two identical graphic cards. However, both ATI (with Crossfire) and Nvidia (with SLI) agree that dual GPU isn't a development supported yet by the professional market. ATI has divided its dual GPU development into consumer and professional and, as yet, there are only consumer drivers available. The technology doesn't work with windowed displays and seems at the moment to be tailored to full-screen games. It's a strange way of prioritising development, but it's another example of the way that the vast consumer market drives professional development.
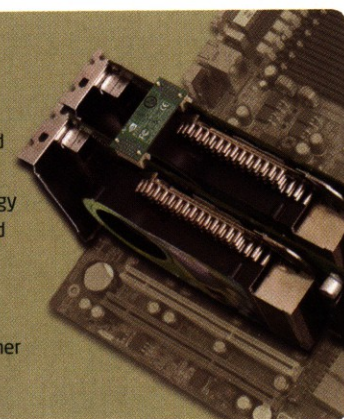
DETAILS

PRICE
• £165* / $299 / €244*
*Currency conversion

PLATFORM
• PC

MINIMUM SYSTEM
• Any computer with a PCI Express graphics slot

MAIN FEATURES
• 256MB RAM
• 2,048x1,536 resolution
• DirectX and OpenGL support

MANUFACTURER
ATI
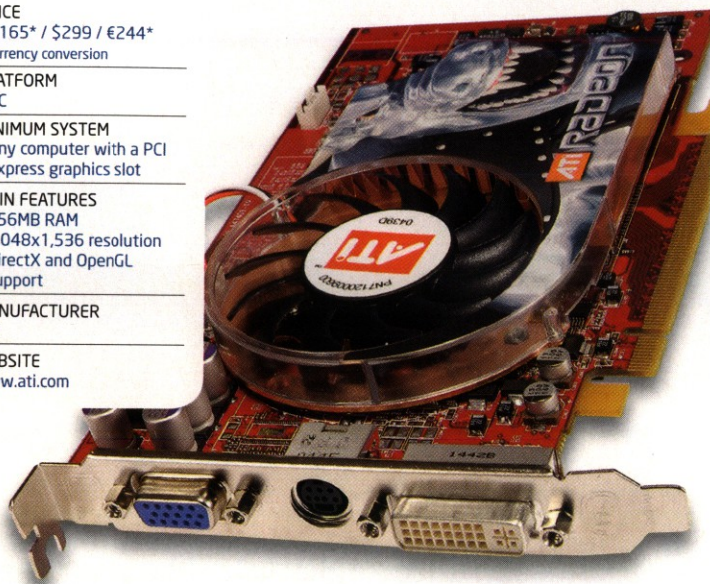
WEBSITE
www.ati.com

DETAILS

PRICE
• £448* / $889* / €663*
*Currency conversion (excluding VAT)

PLATFORM
• PC

MINIMUM SYSTEM
• Any computer with a PCI Express graphics slot

MAIN FEATURES
• 128MB RAM
• 2,048x1,536 resolution
• DirectX and OpenGL

MANUFACTURER
Nvidia

WEBSITE
www.nvidia.co.uk
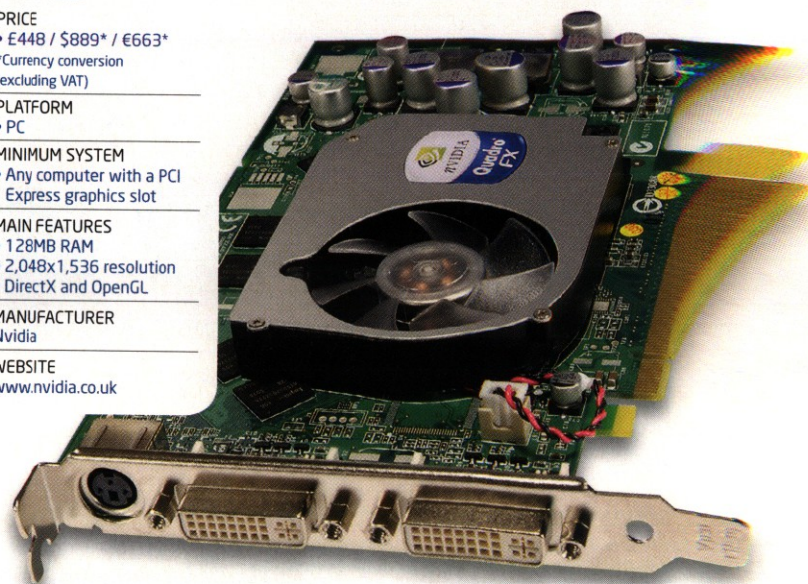
Radeon X800 XL

This card is aimed at the mid-range gamer, so can it possibly have anything to offer pros?

Unusual as it may be to see a company arguing against its own products, this is what ATI is doing with this card. Although the Radeon offers double the DirectX performance of its FireGL V5000 (reviewed on page 80), ATI wants you to buy the latter. The cynical among you may wonder if this is because the workstation cards carry a higher profit margin, but there are lots of side issues to consider, too.

ATI says that the most important disadvantage of using the Radeon for serious work is the fact that it lacks any kind of certified drivers, which means a significant drop in stability. However, we haven't experienced this problem.

As you peruse the supplied driver settings, you realise there are no custom settings for specific applications as there are with the pro card, nor can you use the Ashli shader programming. However, if you're using 3ds Max or Maya in DirectX mode, you'll get better performance from this card than from the V5000.

At just $299 (£165), the fact that the Radeon can be used in dual-GPU mode, with another card, appears to offer a tempting mid-price solution. Bear in mind,

though, that dual-GPU technology is not yet supported by professional programs.

Like all of the other cards, the Radeon has two monitor outputs. This is the only card that has an analogue and a digital output, so if you plan to connect two LCD panels, you'll have to use a converter plug.

The Radeon is also the only card to feature an unusual type of animation-based antialiasing called Temporal AA. On fast animation, the edges of objects are blurred, which creates better antialiasing, but this is only of use in fast animation.

The Radeon is inexpensive, quite good at DirectX, and it supports OpenGL 2. However, of all the cards, it's the one with the most question marks next to its name, even as a budget solution.

VERDICT

PROS
• Good DirectX performance
• Dual-GPU capable

CONS
• No certified drivers
• Questions over its stability
• Poor OpenGL performance

RANGE OF FEATURES	8
VALUE FOR MONEY	7
OVERALL	**7**

Quadro FX 1400

Nvidia's current cards offer a couple of unique benefits, but they may not justify the hype

The Quadro FX 1400 is one of the most expensive cards in our round-up, so you may expect it to be the most powerful. This isn't the case, but it does offer some benefits that make ATI uncomfortable.

For a start, the card is SLI capable. This technology enables you to add a second identical graphics card to your (compatible) motherboard for an increase in performance. How big an increase depends on the program you're running, but it ranges from 90 to –30 per cent (in some cases, adding a card can decrease graphics performance). Nvidia claims a boost of 30 per cent for 3ds Max and Maya, and 60 per cent for CAD applications. It also suggests that you'll see a 90 per cent improvement if you use dual-head mode, running two separate applications (one on each card).

SLI is available so that people can add more cards to boost performance. Why not just buy a single, more powerful card? The only reason is that it provides a scalable solution, so you can try a card to see if it's adequate before using another.

The card's second selling point is its support for Shader Model 3 – the latest

implementation of the DirectX shader language, which enables advanced effects. Nvidia raves about this function, but claims that DirectX support isn't that important in its graphics cards. ATI, optimised for DirectX, doesn't support this technology. You have to decide whether you want the very latest effects provided by this card, which are not yet widely supported by the target games market, or the ease of programmability offered by the ATI card.

The 1400 provides the best DirectX performance of all the workstation cards, but the cheaper GeForce 7800 GTX doubles its performance in this area. It all depends on whether you trust a gaming card for stability. We would risk it.

VERDICT

PROS
• SLI-capable
• Reasonable performance
• Supports Shader Model 3

CONS
• Expensive

RANGE OF FEATURES	7
VALUE FOR MONEY	5
OVERALL	**6**

GeForce 7800 GTX

Would you use a card that's aimed at hardcore gamers, or is it more trouble than it's worth?

How much faith can you put in a card designed for gamers rather than professionals? To hear ATI tell it, even the best of Nvidia's workstation cards could lead to a nightmare of instability, and using games cards, even its own, is commercial suicide.

We exaggerate a little, but the question remains: is this the reality? We've used Nvidia and ATI games cards as the basis of low-cost workstations in the office for 10 years, and have never had problems with a single application, nor experienced a single crash due to the graphics system or its drivers.

Anyway, this one from Nvidia is the only card that requires extra power – all of the others draw what they need from the PCI bus. When you see its DirectX numbers, you can see why it needs this power: it doubles the performance of the nearest workstation card, even exceeding that of high-end workstation cards costing in excess of £1,000.

If that wasn't enough, it supports version three of Microsoft's Shader Model code, so it can produce the most advanced graphical effects possible for accurate previews and real-time renders. The only problem is that, being a games card, it includes no driver optimisations for specific applications, nor does it have the programmability of ATI's Ashli shader language. This only matters if you're going to programme your own shaders.

When it comes to OpenGL, the card is less than exciting, only managing to beat the Radeon games card and falling a good 50 per cent below all of the other cards. Presumably, Nvidia could have got better performance from its OpenGL drivers, but gamers don't need it.

The 7800's DirectX performance is outstanding. If you can do most of your work with this API, it's a seductive alternative to the pro cards.

VERDICT

PROS
• Excellent DirectX performance
• SLI capable
• Supports latest Shader Model

CONS
• No driver certification
• Poor OpenGL performance

RANGE OF FEATURES	8
VALUE FOR MONEY	9
OVERALL	**8**

Wildcat Realizm 500

3Dlabs focuses on CAD-targeted workstation cards, so its designs should be clear winners, right?

3Dlabs' cards have always been anachronistic, opting for quality over performance and honing OpenGL performance, while almost completely eschewing DirectX. In fact, for a long time, the cards provided no DirectX support at all.

Even now, looking at the Realizm 500's results, DirectX implementation can be described as desultory at best. 3Dlabs points out that this is because the 3DMark tests are skewed in favour of fill-rates, whereas the 500 is optimised for geometry processing. But then it would say that, wouldn't it?

Look at the OpenGL performance and you can see that 3Dlabs could rightly claim to be the market's OpenGL specialist, since it achieves as much as 50 per cent more performance than the costlier FX 1400. Nevertheless, placing price into the equation, the card provides about the OpenGL performance differential that you would expect when compared to the V5000.

However, even in this area, 3Dlabs argues that the benchmarks don't use sufficiently large datasets to demonstrate the 500's true strength: its ability to process large models and complex engineering drawings. The card can utilise 16GB of virtual memory (which must slow things down) to handle challenging models. However, most users don't work with massive datasets, and the ViewPerf and DirectX numbers give a reasonably accurate representation of the card's average performance. *3ds Max* or *SolidWorks* users will see the greatest benefits, while CAD designers working with *EnSight* would get almost identical performance from the V5000.

The Wildcat Realizm 500 is a card that works particularly well with a few key applications, especially CAD packages, and so you need to consider your primary application use before you purchase.

VERDICT

PROS
• OpenGL performance
• High image quality
• CAD optimised

CONS
• Abysmal DirectX performance
• A little expensive

RANGE OF FEATURES	5
VALUE FOR MONEY	6
OVERALL	**6**

THIS ISSUE'S WINNER

FireGL V5000

ATI won our last group test with its V5100,
and the V5000 is following in its footsteps

DETAILS

PRICE
• £299 / $540* / €442*
*Currency conversion
(excluding VAT)

PLATFORM
• PC

MINIMUM SYSTEM
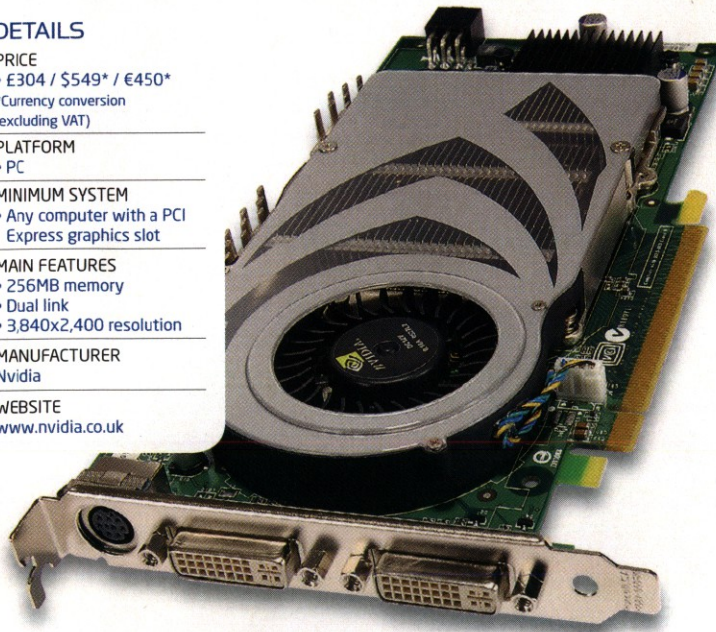• Any computer with a PCI
Express graphics slot

MAIN FEATURES
• DirectX and OpenGL
• 128MB RAM
• 3,840x2,400 resolution

MANUFACTURER
ATI

WEBSITE
www.ati.com

The V5000 is a PCI Express card that uses a full 16 lanes for maximum speed data transfer to and from your computer. It has six geometry engines and eight pixel pipelines. However, even if it had 6,000 pipelines, it wouldn't mean anything unless it translated into real-world performance.

Using generic driver settings optimised for system speed, the card produced decent ViewPerf 8 numbers. It scored well under *3ds Max* and *EnSight*, exceeding the performance of the costlier Quadro card. However, it also comes with optional driver optimisations for a number of programs, including *3ds Max* and *Maya*, which yield a significant performance boost.

The card supports DirectX 9b and Microsoft's HLSL (high-level shader language). This enables it to produce advanced shader effects – translucency, frost, mist or shadows – directly within certain 3D applications. These may be quickly accessed using the simplified Ashli language, which enables you to program your own shaders. Originally, *3ds Max 7* was the only program to support Ashli, but now *Maya* has also added support. It

means that you'll have less need to perform test renders to see advanced effects – they're now supported in real-time in your preview viewport.

In order to take advantage of HLSL,

IT SCORED WELL UNDER 3DS MAX EXCEEDING THE PERFORMANCE OF THE COSTLIER QUADRO CARD

you'll need to configure your computer to use the DirectX API. To be honest, the card offers mediocre DirectX performance. 3DMark gives it the second-lowest score in our test, just below the Quadro. However, when you take into account the price difference between the two cards, the V5000 looks quite reasonable. It also quadruples the miserable DirectX performance of the OpenGL-optimised Realizm card. However, it's strange that this card is especially optimised to provide access to advanced DirectX functionality, yet its drivers favour OpenGL.

The V5000 claims to be the cheapest card to support Dual Link, but the GeForce card also supports it. Perhaps ATI actually meant to say the cheapest workstation

card? Dual Link enables you to connect digital DVI-I outputs to a single monitor, producing a resolution of up to 3,840x2,400. Given the fact that such monitors cost in the region of £2,000, it's highly unlikely that anyone in the market for a budget card would shell out for such a costly screen.

Although the V5000 isn't exceptional in any one particular area, it offers moderate performance in all areas, and at

VERDICT

PROS
• Balanced performance
• Reasonable price
• Certified drivers

CONS
• Not dual GPU capable

RANGE OF FEATURES	8
VALUE FOR MONEY	8
OVERALL	8

THE ATI V5000 WAS THE CARD THAT CAUGHT OUR ATTENTION

CONCLUSION | Fighting among themselves

This was an interesting group test to evaluate, because it forced the manufacturers to compete with themselves. ATI argued that its own Radeon card is unstable with *3ds Max*. The truth is, *3ds Max* didn't crash once with any of the cards. However, this brings us to the crux of the issue: how important is system stability to you?

An occasional crash is an inevitable part of computing. However, as ATI points out, crashes are more inconvenient when it takes 10 minutes to load your dataset, or it occurs during an overnight render - both rather extreme examples.

The manufacturers all provide scalable architecture; the cards from a single manufacturer offer essentially the same core functionality, but by adding memory, processors, geometry engines or pixel pipelines, performance can be enhanced. However, it's the way that the drivers utilise this functionality that makes all the difference.

The Radeon easily offers decent DirectX performance, even exceeding high-end cards costing over £1,000. ATI insists that the card is unstable with certain applications, particularly CAD programs and *3ds Max* in systems with over 2GB of RAM. However, the company has a vested interest in steering you towards its costlier cards. Suffice to say that in our dual-Xeon test system, it behaved perfectly well. Having said that, its OpenGL performance is pitiful, reflecting the games industry's preference for the DirectX API.

In direct contrast to this is 3Dlabs' Wildcat Realizm 500 board, which provided group-topping OpenGL performance, exceeding the costlier Quadro card by almost 50 per cent in the *3ds Max* test, and slightly beating it in most other tests. But its DirectX performance was below every other card.

The GeForce 7800 GTX was certainly a worthy competitor with the highest 3DMark benchtest score as well as excellent DirectX performance. However, this is on the

proviso that you don't need certified drivers as their absence could affect the card's stability.

As so often happens in these round-ups, it wasn't stellar performance in any single area, but rather balanced and considered functionality across the entire spectrum of possible attributes that won through. With that in mind, the ATI V5000 was the card that really caught our attention. It wasn't far behind the Quadro in terms of OpenGL numbers, yet it costs over £150 less. Furthermore, it provides tolerable (though far from spectacular) DirectX performance. It's one of the cheapest cards in the industry to offer dual-link monitor output, enabling you to match the nine-megapixel resolution (3,840x2,400) of hi-res displays. With vendor-certified drivers, the popular Ashli shader language that enables the creation of real-time HLSL shader effects under DirectX, and low power requirements, this card offers extremely good value for money. ●

COMPARISON CHART

MODEL	Memory	Monitor outputs	Max resolution	Antialiasing	Filtering	APIs	Warranty	Multi-GPU?	Price	Score
RADEON X800XL	256MB	DVI, VGA	2,048x1,536	12x temporal	16x anisotropic	DirectX 9c, OpenGL 2	2 years	Yes – Crossfire	£165*	7
QUADRO FX 1400	128MB	2x DVI, 3D stereo	2,048x1,536	16x	16x	DirectX 9, OpenGL 2	3 years	Yes – SLI	£448 (ex VAT)	6
GEFORCE 7800 GTX	256MB	2x DVI, VGA, HDTV	3,840x2,400 dual link	16x trilinear	16x anisotropic	DirectX 9, OpenGL	3 years	Yes – SLI	£304 (ex VAT)	8
REALIZM 500	256MB	2x DVI	2,460x1,600	8x multi-sampling	8x anisotropic	Direct X 9, OpenGL 2	3 years	No	£498*	6
FIREGL V5000	128MB	2x DVI	3,840x2,400 dual link	6x full-scene aa	16x anisotropic	DirectX 9b, OpenGL 2	3 years	No	£299	8

*Currency conversion

BENCHMARKS – SpecViewPerf 8 and 3DMark 2005 (higher is better)

| MODEL	3dsmax-03	Catia-01	Ensite-01	Light-07	Maya-01	Proe-03	Sw-01	Ugs-04	3DMark
RADEON X800XL	12.32	10.74	18.07	10.46	15.06	14.09	11.85	12.95	4,997
QUADRO FX 1400	31.6	26.5	18.53	23.32	50.83	47.81	21.4	27.1	3,158
GEFORCE 7800 GTX	20.71	12.79	14.98	12.22	24.23	18.05	15.66	9.659	7,593
REALIZM 500	45.24	27.59	23.06	20.35	55.38	42.64	27.51	29.13	760
FIREGL V5000	31.11	20.89	22.1	16.95	39.88	40.76	20.34	19.81	2,855

Alias MotionBuilder 7

The mighty animation package receives its second full-point upgrade in under a year. But do its new features amount to more than a set of tweaks? **BY CHRIS OLLIS**

ust over a year ago, Alias bought up Kaydara's esteemed animation package, quickly releasing a version under its own name [*Alias MotionBuilder 6*, reviewed issue 62]. Barely half a year on, version 7 is already in the stores. So what warrants this second full-point release? What amazing features have been added? Or, conversely, what was wrong with the last one?

MotionBuilder, as its established users will tell you, is a fantastic animation package. Primarily aimed at character animators, its speed and visual feedback are about as good as it gets when working on multiple character sequences. The power of its FCurve and layer systems makes keyframe and motion capture adjustment a breeze, and its Motion Blend tools (*Pro* version only) and Story mode make the cross pollination of motion data as easy as stapling two bits of paper together. But these are things you should know from previous versions – what about more recent enhancements?

Version six did have some problems. If you scratched below the surface, you could find a selection of strange 'glitches': things that wouldn't undo, confusion
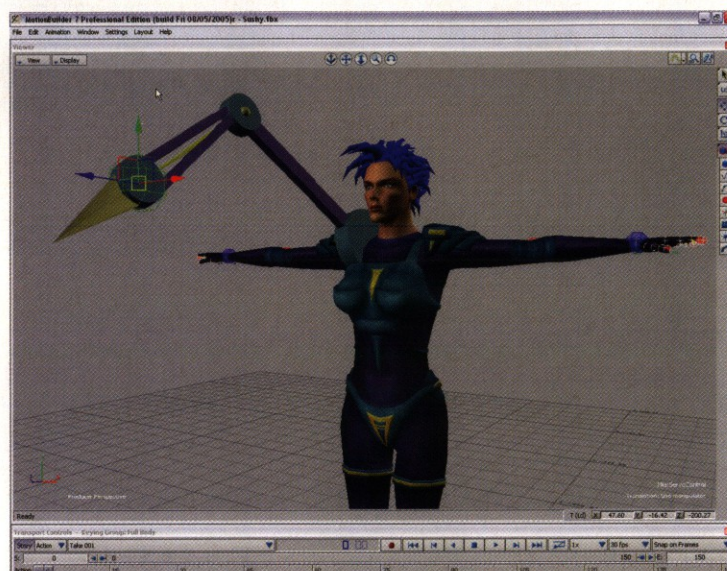
● Character rigs can be easily accessorised through *MotionBuilder 7*'s new Character Extensions. Here, they have been used to add an IK rigged robotic arm to a sci-fi character's shoulder!

between IK and FK keys and auxiliary disasters, to name a few. So it was with great interest that we installed this version, held our collective breath and tried each one. We take our hats off to Alias. It's listened to the users and fixed everything we could think of. Non-keyframed camera movements can now be undone, as can

auxiliary adjustments. Multiple auxiliaries on multiple characters can now be left in the scene without collapsing into one, and even AVI files load straight in to the Story mode. However, we can't really count these as plus points, as they shouldn't have been broken in the first place.

Fixes aside, what's actually new? As with version six, the differences are tweaks to existing stuff and new bits that unfortunately barely raise an eyebrow in a world used to major advances like cloth, subsurface scattering and HDRI. Character Extensions have been added, which are a new way to quickly associate objects and extra bones to your rigs: swords, wings, skateboards and so forth

● Retargeting animation between characters has been made even easier in version 7 with the introduction of the new Load/Save Animation feature

● With the numerous constraints and automated functions, the eyes – like this chap's – can be left to sort themselves out
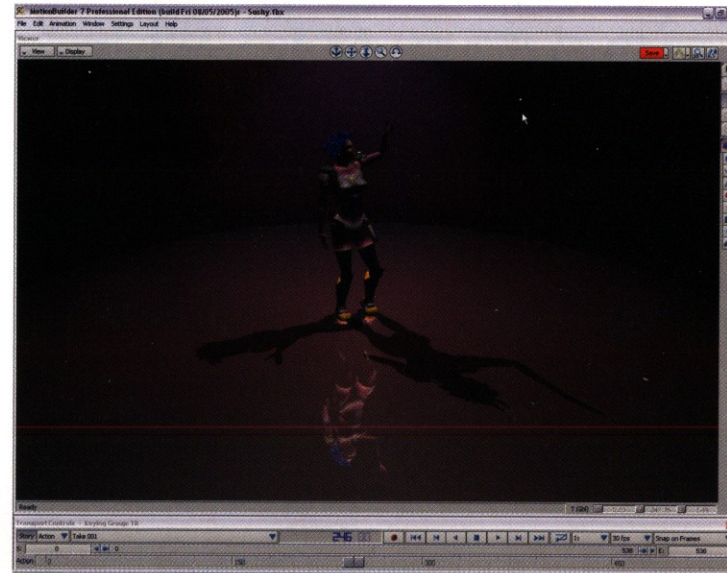
become part of the character. But this is more than just a handy grouping tool. It opens up the way to extra IK links, constraints to the objects and a more practical way of working.

The rigs themselves have also been tweaked to provide more visual feedback of what you're grabbing and controlling. Simple colour codes and extra notes appear to save you valuable time navigating the UI. A really good new Load/Save Animation function has also been added (*Pro* version only), offering a new path for retargeting motion between characters. Instead of clicking and ticking through the navigator as before, the new option provides a simple Load/Retarget/OK window, which greatly speeds things up.

In addition, angled floor contacts have been added, a whole bunch of constraints have been streamlined and updated for more accessible use, and handles have been enhanced in numerous ways. But perhaps the strangest new feature is a Save Reminder: a small icon that sits at the top of the screen and becomes increasingly irate the longer you go without saving. Users of *MotionBuilder 6* may feel that this is a very valid addition ...

● *MotionBuilder 7*'s real-time lighting capabilities, with active reflections and dramatic shadow effects, help to make the work environment a joy to behold

THROUGHOUT THIS REVIEW, WE'VE UMMED AND AHHED ABOUT HOW GOOD THIS VERSION ACTUALLY IS

That just about covers the universal amendments, but before we move on, it's worth mentioning a couple of the more specialised ones. Being Alias' new toy, it's not surprising that *Maya* users should benefit. Integration between the two products has been implemented to quite a degree, so you can throw your *MotionBuilder* rig into *Maya* without a hiccup, and your *Maya* constraints back in to *MotionBuilder*. *Maya* users will no doubt get excited by this news. It's one heck of a

character plug-in to have at your disposal, although it does cost more than *HumanIK* did for *3ds Max* [reviewed issue 40].

Throughout this review, we've ummed and ahhed about how good this version actually is. On paper, things don't look so impressive – many of the improvements are features we would rarely use. But then we realised that we were looking at version 7 as an upgrade, wrongly disregarding the existing features. When we started testing, we remembered why we enjoyed using version five so much. *MotionBuilder 7* seems to have recaptured the pleasure of using a decent character animation package. It enables you to manipulate your character quickly, and adjust the keyframes or motion capture at an even faster rate. It has stacks of handy little tools for pinning

bits down and changing rigs, and a fair old range of fancy colours, lights and particles to make your test render sparkle. But then again, it's relatively expensive: £645 for the *Standard* edition, or £2,725 for the full version. It's a lot of money when you're really just talking about a character extension to your main software. If you're using *3ds Max* with all its *Character Studio* updates, you have to question the cost.

This is such a tough one to call. While *MotionBuilder 7* is a lot of fun to use, it could do more: for example, cloth and other soft body dynamics. If *MotionBuilder* is going to take the crown of the world's greatest animation package, it needs to cover all bases. Hair would obviously be pushing things a little, but with some development of the secondary motion rigs that sneak in here and there (a zombie character has dangling mouth bits, and a warthog-like thing has a mane that sways as it moves) Alias could provide some fairly good geometry hair that would suffice even for most next-gen game makers. ●

● Real-time cel shading looks amazing when combined with a well-choreographed, motion-captured fight sequence
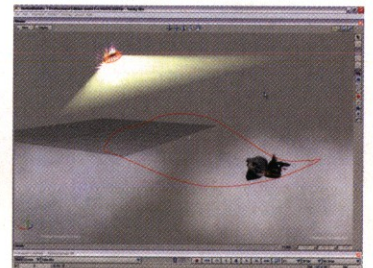
● 3D path constraints make a bird's flight easy, even when it's ridiculously ungainly and uncoordinated

● Handles have been updated in various ways. Custom appearances let you tell the user what each bit does without an instruction manual

● The story window is a powerful interface that provides easy access to motion blending, timing adjustments, audio and video inputs

● The selection of characters is quite varied and some are complex. This guy blinks and has a stomach that moves when he breathes!
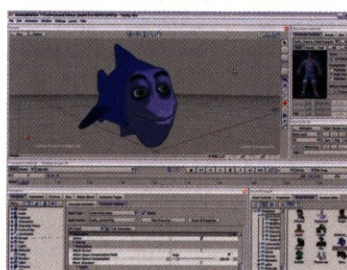
● *MotionBuilder 7* is by no means restricted to bipedal characters. This fishy fella is rigged up through the usual IK interface

VERDICT

PROS
● As good with keyframing as motion capture
● Powerful WYSIWYG interface

CONS
● Not cheap
● *Standard* version doesn't include some key tools

RANGE OF FEATURES	7
VALUE FOR MONEY	7
OVERALL	**8**

Cinema 4D 9.5

Maxon's latest update is loaded with improvements and goodies. In actual fact, Cinema 4D 9.5 has something to please nearly every type of user STEVE JARRATT

And so the *Cinema 4D* snowball rolls ever onwards. Following the major version 9 update last year, we received a small but feature-packed version 9.1 in February, the new *Engineering Bundle* in June, followed up now with *C4D 9.5*.

Because this is a .5 upgrade, there are no truly earth-shattering highlights; after all, version 9 introduced N-gons, sub-poly displacement and one of the coolest cloth tools around, so it's a hard act to follow. But we do get numerous improvements and enhancements, plus some cool new toys.

In terms of visual treats, *C4D*'s new Sky shader is the biggest crowd pleaser. There's no longer any need to import spherical maps or struggle with clumsy procedurals – this system now produces lovely photorealistic skies, complete with clouds, rainbows, a properly visible sun (plus sunbeams), and even a physically correct starfield. It's easy to use, and with GI turned on, you can use these skies as your primary source of lighting for moody, realistic renders.

PAINTING CLOUDS

What isn't immediately apparent is the addition of volumetric clouds and fog. For the creation of individual clouds, you can paint them into your scene (they're previewed as dots within a bounding box), or use a primitive shape or particles to

● The new content browser shows thumbnails of images, objects and rendered scenes, and can keep track of all your assets

delineate where the cloud forms appear. All cloud objects are truly volumetric and can be flown through, but render times are pleasantly quick, so you can add them liberally without too much of an overhead. However, we did find the Sky shader a bit glitchy: when painting clouds, the bounding box might suddenly jump to a new location, and occasionally our sunbeams weren't properly located on the sun object.

Ground fog is applied on a 'per scene' basis and provides more control than the usual Start and End distances. Density can be described using a spline control field and the fogbank exists in true 3D, hence the ability to set a height value. It also allows for lovely volumetric shadows cast by sunlight, though this is a much more CPU-intensive process and for the best quality without sampling artifacts, you can expect render times to head skywards.
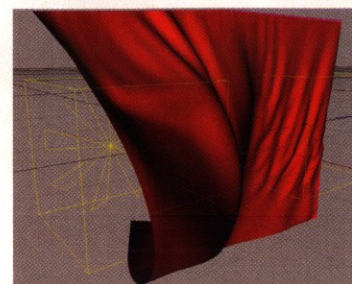
● *C4D*'s particle system generators can now be added to the Clothilde Include list. Here, wind is applied on the left, turbulence on the right

The aforementioned cloth tool, Clothilde, has been reworked to tidy up the interface and add new features. Cloth now reacts to *C4D*'s particle system generators, gravity, wind, turbulence and drag, providing precise control over your simulation. For example, you could apply wind to one end of a flag and inverse gravity to the other. Cloth doesn't react to particles directly, but it's easy enough to emulate with these tools.

Other updates include a tear map, to control precisely where your cloth object rips, a belt tag and much improved local caching, which enables you to bake the simulation but still move the object itself. A new cache tool even lets you make fine adjustments to the cached data on a point-by-point basis. We were big fans of Clothilde before, and now it's more of a joy to use.

FAST RENDERING

Version 9.5 benefits from some serious tweaking of the rendering engine, and the purported speed increases can be quite
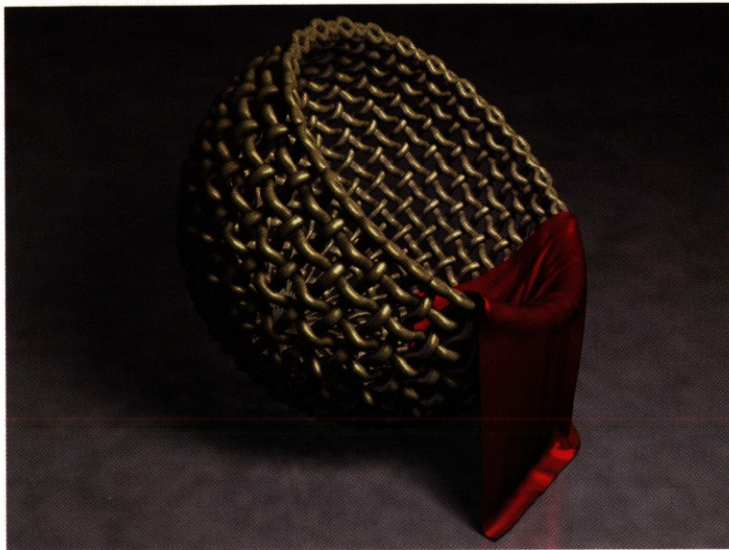

● *C4D* can now create a normal map from displacements. These two coins look identical, but the normal-mapped one renders three times faster. See the other three coin images opposite

● This is the original displacement map created in *Cinema 4D 9.5*

● This *fusionThing* object has an area light and diffuse reflections. In render tests, *C4D 9.5* usually outperformed *C4D 9* by a factor of 10. With quality levels cranked up, it was 20 times faster

Image courtesy of Avid Technology Inc.

● Modellers can now concentrate on the task at hand by entering full-screen mode ([Ctrl]+[Tab]) and by using the context-sensitive shortcuts introduced in *Cinema 4D 9*
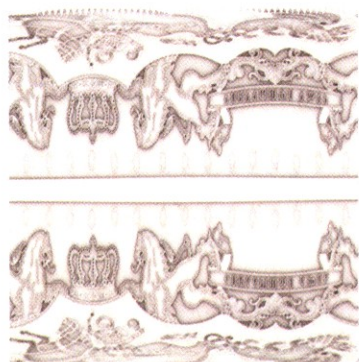
substantial. Most scenes gain a slight speed hike, but when using GI, area lights or soft reflections, we saw anything up to 10 times the speed of rendering from version 9.1. For those who do photoreal imaging work, the speed boost alone is worth the upgrade fee.

Maxon is always keen to keep up with current trends, and so *C4D 9.5* also gains the feature du jour: ambient occlusion. This is a very quick method of adding the subtle ambient shadows that radiosity generates,

The baker function now also boasts normal mapping, which, uniquely, can be generated from sub-poly displaced objects. As long as your object isn't displaced to an enormous extent, such as a landscape, you can bake the detail and then just use a mapped, low-poly version instead. It takes quite a time to generate a hi-res normal map suitable for close-up work, but this is more than made up for by not having to constantly recalculate displacements.

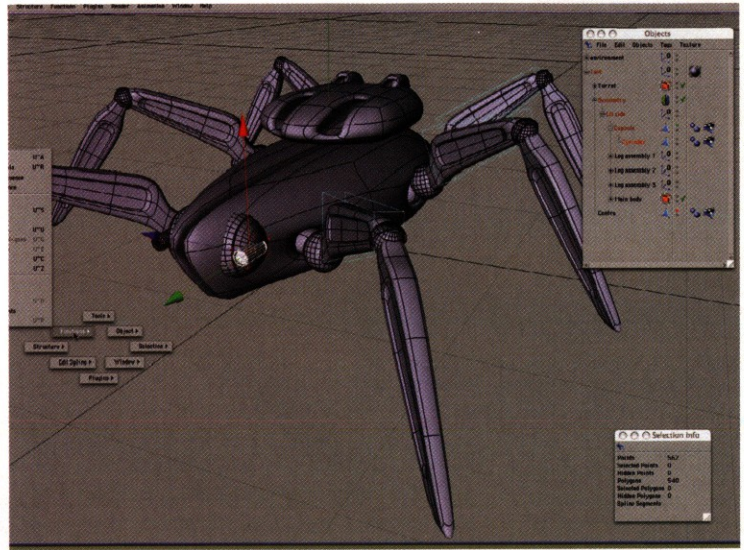## FOR PHOTOREAL IMAGING WORK, THE SPEED BOOST ALONE IS WORTH THE UPGRADE FEE

but without the hit of a full radiosity render. AO can be added to a material channel or, thankfully, globally per scene, and can also be baked to a texture map. A gradient option enables you to alter the colour of the shading, and so AO can easily be used for dirt, rust, moss and so on.

Another major new highlight is the overhauled and expanded content browser. Like the browser in *Photoshop*, it provides easy access to all scene files, objects, shaders, bitmaps and so on, and features a definable search function. It automatically generates thumbnail images of your scenes

(preview or full render) and is now fully drag-and-drop, enabling you to add elements to an existing scene, or apply the new Sky presets, for example. This new functionality also extends to creating presets for rendering output, default lights, primitives and more. So, if you work at a number of resolutions and frame rates, you can create presets for each style, rather than having to go in and continually alter the settings.

The content browser has clearly been designed to help manage future iterations of *C4D*, and while it's not exactly a deal breaker, as the program (and your library of content) becomes ever more complex, this will no doubt prove to be a real godsend.

A GOOD SEQUEL

This is an impressive, if slightly scattergun, upgrade. Fractional-point releases are always a mixed bag, but Maxon has certainly tried hard to add a little something for everyone (we haven't had room to discuss the 32-bit image support, tweaks to the light types or the new scripting system). The frequently requested improvements to the character animation tools and timeline have yet to materialise, but it's hard to fault the cumulative effect of more than 80 additions and enhancements.

Following in the footsteps of the *Engineering Bundle*, one has a sense that this adds the finishing touches for the architectural and visualisation crowd, with a great sky tool, improved lighting and faster rendering. Like an open-ended movie, you can't help feeling that there's a bigger and even more exciting sequel on the way. ●

● The Sky shader also features ground fog, which can display volumetric shadows. They're pretty, but they're not quick

● The ambient occlusion map. See the main coin image on page 84

● Finally, the generated normal map. Again, refer to the main coin image

VERDICT

PROS
• Impressive Sky shader
• Multitude of useful UI tweaks

CONS
• Not enough in this upgrade for character animators
• Some Sky shader weirdness

RANGE OF FEATURES	8
VALUE FOR MONEY	7
OVERALL	8

PLUG-IN

Mesh Deformer 1

When you want to make your objects twist, bend, droop or flap, you need to take a more coordinated approach

STEVE JARRATT

DETAILS

PRICE
• £30* / $54* / €44
*Currency conversion

PLATFORM
PC / Mac

MINIMUM SYSTEM
• Any system capable of running *Cinema 4D 8.5*

MAIN FEATURES
• Objects can follow UV grid of underlying mesh
• Keyframing of UV coordinates for animation
• Alters the scale and offset of deformed objects

DEVELOPER
Renato Tarabella

WEBSITE
www.tarabella.it/c4d

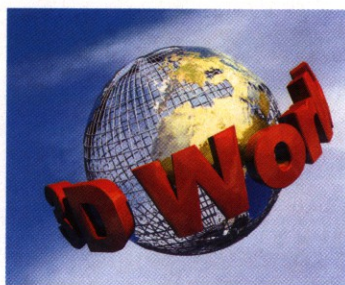This ingenious system enables an existing mesh to follow the contours of any object possessing a UVW tag. Activation is as simple as applying *Mesh Deformer (MD)* to a chosen object before dragging the UV base mesh into the selection field. *MD* then distorts the geometry of the object mesh according to the UV coordinates of the underlying object.

Movement of the object can be animated by keyframing the U and V values, but you have to be careful of moving too close to the edge of the UV grid, because the values wrap, and you can get slivers of your mesh suddenly stretching across the screen (the developer is sorting this).

Another useful aspect of *MD*, is that you can apply version 9's Clothilde tag to a supporting object, which deforms your mesh appropriately, turning solid objects into flapping, squishy, drooping ones – good for creating organic structures.

Development of *Mesh Deformer* should now have progressed to version 1.1, providing support for any of *C4D's* deformers and enabling you to create more complicated effects. This opens up endless possibilities for flowing, organic animations. It's a powerful tool but not one you'll use every day, yet it has potential. It's pricey for a plug-in, but it adds another trick to the *C4D* motion designer's repertoire. ●

● This *3D World* logo is an extruded text spline object, deformed over a sphere with a UV tag

VERDICT

PROS
• Nice effects with Clothilde
• V1.1 supports application of *C4D* deformers

CONS
• Easy to wrap near the edges of the UV
• Glitches to be ironed out

RANGE OF FEATURES	6
VALUE FOR MONEY	7
OVERALL	**7**

PLUG-IN

fusionThing 1

No matter what you build in Cinema 4D, you can take it to another level with this impressive procedural modelling tool

STEVE JARRATT

DETAILS

PRICE
£109* / $195 / €160*
*Currency conversion
(excluding VAT)

PLATFORM
PC / Mac

MINIMUM SYSTEM
• Any system capable of running *Cinema 4D 8.5*

MAIN FEATURES
• Populate parent items with multiple child objects
• Variable object arrays based on probabilities

DEVELOPER
Lots of Pixels

WEBSITE
www.lotsofpixels.com

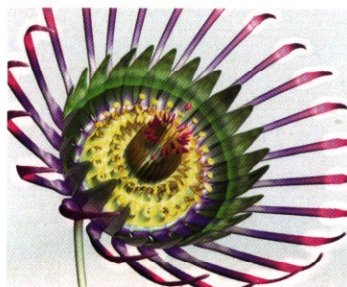The aim of *fusionThing* is simple: to connect objects via user-defined polygons. As long as the number of vertices on the 'child' selection matches those on the parent, *fusionThing* will move, scale and rotate the child object into place. It also welds coincident points and removes unwanted polys to make seamless meshes to be Hypernurbed.

However, make multiple selections and *fusionThing* will clone your child object across the base mesh, or even distribute a number of different child objects based on relative probabilities. But there's more: create your child object so it's tileable and *fusionThing* will array them, then weld them all together to make a single clean mesh.

We're only scratching the surface. You can use *fusionThing* iteratively to create hugely complex geometric objects. You can tweak clones' position, scale and rotation values to create asymmetric models, and then keyframe them for animation.

It's hard to do justice to this plug-in. Its applications range from the architectural to the organic; from industrial prototyping to abstract motion graphics. There are only two drawbacks to *fusionThing*: the manual takes a few reads before you understand it, and it's rather too easy to create overly complex meshes that slow *C4D* down to a crawl! If you use *C4D* on a regular basis, *fusionThing* is a must-buy plug-in. ●

● This flower is made of a core and just four polygonal objects: leaf, petal and two stamen

VERDICT

PROS
• Makes highly complex meshes
• Seamlessly welds objects together for Hypernurbing
• Plenty of possible applications

CONS
• Complicated to learn
• Can slow down *CD4*

RANGE OF FEATURES	10
VALUE FOR MONEY	8
OVERALL	**9**

Massive 2

The only crowd solution ever to receive a coveted Academy Award reaches a new level of sophistication with version two

BY JORDI BARES

MASSIVE
SOFTWARE

DETAILS

PRICE
- £12,283* / $22,000 / €18,109* (includes one year's updates & support)
*Currency conversion

PLATFORM
Linux

MINIMUM SYSTEM
- Linux Red Hat 7.3, 9.0, Fedora Core 2
- 1GHz Pentium processor
- 512GB RAM
- Nvidia GeForce graphics card

MAIN FEATURES
- Fuzzy logic-based AI system
- Smart Stunts technology
- Active Motion Tree Planner
- Cloth dynamics
- RBD engine (Glow-worm and ODE)
- *Render Man*-compatible export (*PRMan, 3Delight* and *AIR*)
- *Maya* and *Softimage XSI* integration

DEVELOPER
Massive Software

WEBSITE
www.massivesoftware.com

Massive by name, massive by nature – this $22,000 crowd-simulation tool and AI-based 3D animation system was developed for *The Lord of the Rings* trilogy, which led to the Scientific and Engineering Academy Award. It has been commercially available for more than a year, and is used by many leading effects houses, such as The Mill and Digital Domain.

The first version delivered an elegant means of designing an agent's behaviour, a crowd, or any other autonomous animation; version two represents an impressive period of further development. Alongside bug fixes, there are new tools that cater for brain building, animation and rendering.

BRAIN BUILDING

First, the brain building and planning area: Active Motion Tree. Users are no longer required to generate brain nodes to control agents, which makes the planning and development process much easier. There are a number of enhancements for animation, too, including animated rotoscopy, improved sound, shape animation and skinning data import/export. *Maya* integration and *XSI* import have been improved, and there are handier placement tools and full viewport antialiasing. Agents can now 'paint' (leave trails, such as footprints) on the floor, and learn and predict other agents' movements – one of the most important features of version 2.

In terms of rendering, the major enhancements are a new system for rendering passes and a better simulation strategy, which makes a noticeable difference in production. The next release

also promises a new hardware rendering approach using Nvidia FX graphics cards that will let any shop, of any scale, produce full-quality work without the need for an expensive *RenderMan* pipeline. Also on the cards is integration with *Mental Ray*, which many users were waiting for.

Other new technologies include Massive Live for inputting real-world data from external devices such as a joystick; 'Smart Stunts': effectively a way to play motion capture and rigid body dynamics at the same time while avoiding the rag doll look; plus new Python and TCL support for automating repetitive tasks.

To make things easier for beginners who just want to drop a few thousand characters here and there, you can use pre-built agents. These can be modified and are a great learning resource, even for advanced users. In addition, a great deal of work has been put into documentation and

training, including a vast collection of tutorials – *Massive* isn't exactly difficult to master, but it's different to anything else currently on the market.

Not everything is perfect: the interface is still not that clearly organised, and you should double-check that your graphics card will support the very latest technology. But niggles aside, this is a truly original tool and a massively important upgrade. ●

● *Massive 2* enables users to create complex crowd scenes at full quality. This Nike commercial, created by The Mill, shows Barcelona stadium populated with 93,000 separate digital agents

● The same scene in-software, showing the layered placement of agents within the four tiers of the stadium

● A view of the animation editor. New animation tools in version 2 include improved shape animation and skinning data export
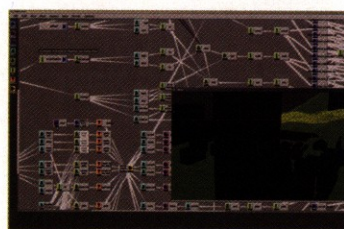
● While scenes can become complex – this shot contained 148,000 people – *Massive*'s graphical workflow requires no coding or programming

VERDICT

PROS
- Fuzzy logic-based AI system
- Ready-to-run agents
- Graphical workflow: no programming required

CONS
- Interface needs reorganising

RANGE OF FEATURES	9
VALUE FOR MONEY	10
OVERALL	**9**

RELATED PRODUCTS

- *MotionBuilder 7 Pro*
  Reviewed: page 82

LipSync Master

This new lip-sync tool enables you to edit and export phoneme data files to your 3D software. But does it put its money where its mouth is? **BY PETE DRAPER**

ipSync Master (LSM) is a new standalone animation tool that takes a basic PCM audio file and text script, and then outputs phoneme data files to be imported into a 3D application.

Once the text and audio files are imported, editing the word positioning is relatively easy to get to grips with, though it can be frustrating at times – you have to select the word, reposition it with the left mouse button, then adjust the width of the word block by right-clicking and adjusting at the sides with the left button again. It's a tricky task at first, especially if you're used to the traditional method of using the single left button, with hot areas of the clip at the sides for adjustment.

The program's time slider can be accessed and played back from entered frame numbers. However, there isn't the ability to scrub back and forth through the audio file precisely, which makes positioning fast-spoken words difficult. But there are plenty of positive features, such as being able to lock the word to the left of the current word (or all words), so you don't accidentally nudge everything across. Handy, considering there's no undo feature.

Phonemes within these words can be viewed and edited. They are derived from the application's massive dictionary, and custom dictionaries can be created if a word can't be sourced. One major benefit *LSM* provides is support for multiple audio tracks and scripts, so you can have a conversation or narration with multiple characters' dialogue, and you don't have to perform any re-timing in your main 3D software. This can
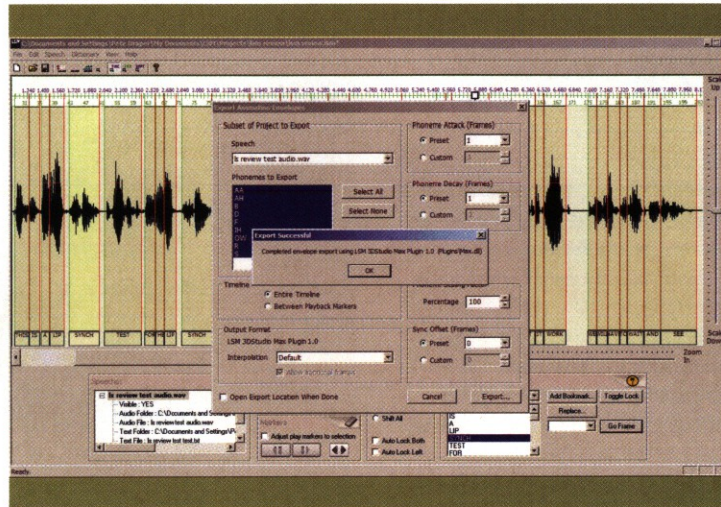
● The phoneme data is tweaked before exporting, amending attack and decay settings. The resulting files are saved with individual files per phoneme

be filtered in *LSM* so that you only view and edit the relevant dialogue track, but you can also view word blocks for other tracks.

To get the animation data into *3ds Max*, for example, you can export any number of phonemes that are loaded in via a provided script. The program loads each phoneme and assigns it to a chosen object with a morph modifier applied, baking the relevant phoneme file data into the associated morph channel's controller.

SOUND PLACEMENT

It's a shame that there's no basic automatic assigning of words/phonemes in *LSM*; instead, this program relies on the user to place each one accurately. There are other applications available that do exactly this, saving valuable positioning time. Some

other products also incorporate curve blending to edit the attack and decay of phoneme blending; *LSM* doesn't. It has Phoneme Attack and Decay settings in the export, but only as numerical values.

The lack of fine curve refinement makes us rely on a 3D tool's animation handling to smooth out and tweak the final curve data. It would be good to have these tools built into *LSM*, with a preview 3D head/mouth to illustrate the final motion. This is especially useful if animation data is to be exported to multiple 3D programs, ensuring that the data is identical for each export and reducing the need to tweak later on.

LipSync Master is straightforward to use and does its job, but Letterbox Animation Studios still has some improvements to make in a few key areas. ●
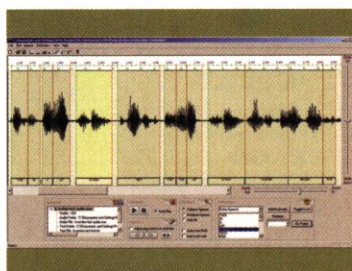
● After importing the relevant audio and text script dialogue files, you simply have to fit the script words to the audio peaks
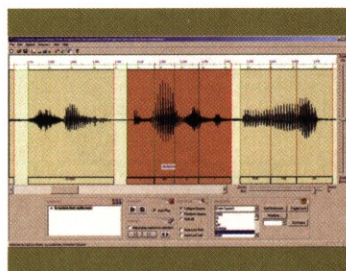
● Once words have been blocked out, further adjustments can be made by positioning the phonemes that make up the word

DETAILS

PRICE
• £799 / $1,422* / €1,149*
*Currency conversion (excluding VAT)

PLATFORM
PC

MINIMUM SYSTEM
PC
• Windows 2000 / XP
• 1GHz processor
• 256MB RAM

MAIN FEATURES
• Output reduced phoneme sets
• Phoneme editing for further refinement
• Additional exports can be coded
• 130,000-word dictionary

DEVELOPER
Letterbox Animation Studios

WEBSITE
www.letterboxanimation studios.com

VERDICT

PROS
• Good export options
• Easy assignment of words to audio
• Large dictionary

CONS
• CPU intensive
• No undo feature

RANGE OF FEATURES	7
VALUE FOR MONEY	7
OVERALL	7

RELATED PRODUCTS

• *LifeStudio:HEAD 2.5*
Reviewed: Issue 44
• *DAZ Mimic Pro 3*
Reviewed: Issue 59
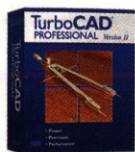
TurboCAD Pro 11

An amazing CAD powerhouse at a bargain price, TurboCAD Professional 11 has designs on becoming the industry leader

BY MARC & MIKE DE LA FLOR

urboCAD has been battling AutoCAD for market share since the 1980s, and it's certainly up to the challenge. The relationship between AutoCAD and TurboCAD is similar to that between 3ds Max and Cinema 4D. While Cinema 4D can do just about anything 3ds Max can do, 3ds Max is considered to be the industry leader. When you're not in front, you have to work harder to convince people to buy your products by providing a quality product at a reasonable price, and International Microcomputer Software, Inc (IMSI) has done just that with TurboCAD.

With over 250 tools, and dozens of palettes and menus, TurboCAD's interface makes it difficult to know where to start. IMSI has done the only thing possible in a situation like this, providing the flexibility to choose which tools to make visible and which to hide. TurboCAD's interface can be easily customised for drawing, modelling or both. Regardless of any customisation, getting your head around the interface is an overwhelming task, even for those with experience of other CAD applications.

Though TurboCAD is a mature application, IMSI has managed to add new tools and functionality to an already bursting toolset. Major updates in this version include UGS' D-Cubed 2D geometric constrain system, providing designers wi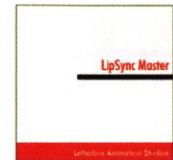th unprecedented directional control and consistency when editing drawings, and a jump to ACIS version 14 solid modelling engine provides a modest increase in speed and improved NURBS functionality. This new release also provides architects with a slew of new tools, including improved XREF import/export, self-healing walls, interior and exterior wall materials, wall openings with styles, parametric roofs, roof dimensioning and editing.
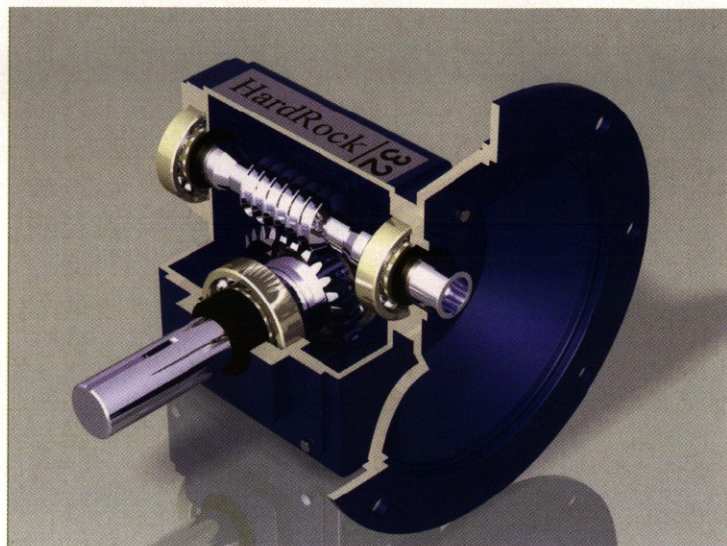
SUPERB MODELLING

TurboCAD excels at 3D modelling and performs better than AutoCAD in this respect. TurboCAD's ACIS implementation features hybrid solid and surface, NURBS and polygonal modelling. Tools include splines, extrusions, revolve/spirals, Booleans, shelling, lofting and blending. Fillet, chamfer and rounding tools are included as well as the new Region Extrude tool, which builds complex 3D shapes from 2D surfaces. If you're a skilled modeller in any other 3D application, you'll be able to model in TurboCAD straight away.

While TurboCAD isn't the industry leader, it's still a popular design solution for professionals and hobbyists alike. Architects and engineers will be hard pressed to find anything lacking from its rich 2D and 3D toolsets, and hobbyists in particular will find TurboCAD reasonably priced at only $749, a mere fraction of AutoCAD's hefty $3,750. TurboCAD ships with the LightWorks 7.4 rendering engine, making photorealistic and non-photorealistic renders possible. Though TurboCAD doesn't have animation tools, basic animation is possible with plug-ins. Overall, TurboCAD is a comprehensive tool for professional design and well worth the money. ●

● Adding to TurboCAD's all-inclusive 2D and 3D design tools is LightWorks' excellent render engine. TurboCAD is capable of producing photorealistic and non-photorealistic images

● TurboCAD Pro 11 contains many new design tools, such as Spatial's ACIS version 14 solid modelling engine

● TurboCAD's interface can be a bit intimidating at first, and as with most CAD programs, there's a lot to learn

VERDICT

PROS
• Comprehensive 2D and
  3D toolset
• Powerful 3D modelling

CONS
• Interface is confusing
• Steep learning curve

RANGE OF FEATURES	9
VALUE FOR MONEY	10
OVERALL	9

SketchBook Pro 2

Transform your Tablet PC into a digital sketchpad to bring your design ideas or storyboards to life, wherever you may be

BY MAT BROOMFIELD

J ust 15 years ago, Tablet PCs were shown in the futuristic world of *Star Trek*, and they seemed like an impossibly exciting idea. These days, they're commonplace, and the *Star Trek* vision looks limited and ridiculously passé. With *SketchBook Pro 2*, you can use your Tablet PC to make quick sketches, or to create more detailed artistic works. This makes it ideal for producing storyboard ideas or design sketches while on the move.

SketchBook Pro 2 is a very good idea, being an art package that's optimised for the reduced screen, memory and processor of Tablet PCs. It's designed so that you can access its main features using a pressure-sensitive pen, which means you click on large icons to select the required options, avoiding any complicated menus.

THE BARE ESSENTIALS

Essentially, you're provided with seven basic drawing tools: a pen, pencil, airbrush, eraser, marker, ballpoint pen and paintbrush. You can make basic changes to the way these tools respond to your movements and levels of pressure, change ink colours, opacity and so on, create and re-order layers, and make simple selections using the Lasso tool. The software provides support for *Photoshop* output, but otherwise, that's about it.

The program uses 'gesture-based' controls, by which Alias means that you can just move in a general direction to select tools and parameters without having to drag sliders or click many buttons. This is useful, and has been well implemented,

● *SketchBook Pro 2*'s interface is clean and simple. Key toolbars can be left open to speed up navigation, and gesture-based controls activate when you move in their general direction

minimising the space occupied by the controls while maximising your working area. However, there are many more features that could have been added, such as shape recognition and smoothing, and menus that pop up wherever the pen is.

Bearing in mind the limited screen size and resolution of the average Tablet computer, it makes sense to keep the screen uncluttered and the options simple. But you can only simplify so far before you start omitting essential artistic features. For instance, you would have thought that a fill tool was *de rigueur* in any graphics package these days, otherwise you would have to manually scribble-fill any large areas of continuous colour. Moreover, simple line, ellipse and rectangle tools don't represent a technical marvel, yet they save a lot of

messing around in certain situations. Unfortunately, none of these are present in *SketchBook Pro 2*. You could forgive the absence of pattern fills, advanced selection tools, effects and so on, as they're not essential to the process of quickly sketching out images, but the omission of obvious and universal time-savers is frustrating.

The drawing tools feel great to use and the program is easy to navigate. However, notwithstanding the fact that *SketchBook Pro* is designed for low-spec systems, it's still too basic. While Alias pitches the product as a pure – and therefore intentionally simple – sketching package, not every user will see it that way. Given that *Photoshop Elements* also runs on a Tablet PC, you may be better off learning to use its more complex navigation system. ●
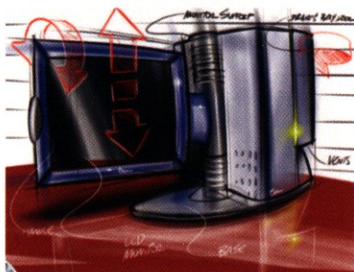
● The program is particularly valuable for presentations, design realisation and storyboarding on the move
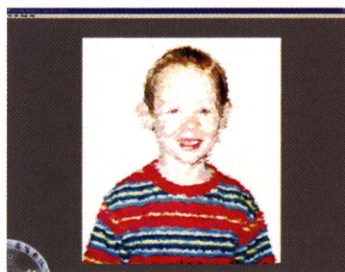
● *SketchBook Pro 2* has an uncluttered design, maximising your drawing space, which is essential on small Tablet PC screens

VERDICT

PROS
● Simple interface
● Low system requirements
● Tablet PC optimised

CONS
● Very limited toolset
● Lacks many features some users will regard as obvious

RANGE OF FEATURES	6
VALUE FOR MONEY	5
OVERALL	**6**

DETAILS

AUTHOR
Robin Beauchamp

PUBLISHER
Focal Press

PRICE
£20 / $35 / €30*
*Currency conversion

PAGES
216

ISBN
0-240-80733-2
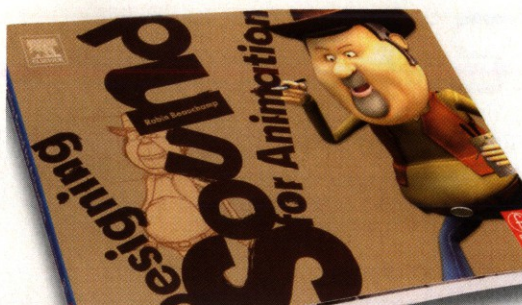
Designing Sound for Animation

George Lucas once commented that "sound is 50 per cent of the motion picture experience," yet for many animation filmmakers, sound is an afterthought, leaving sound designers and composers little time to contribute their skills.

In this book, Robin Beauchamp makes his appeal to animators by providing them with sound-production theory, a practical filmmaking pipeline, and a DVD containing a breakdown of his approach to the design and composition of sound for a collection of animated short films. It's downright comprehensive, even covering 'Arts Law' to enlighten animators to the legalities of using music and sound in their films.

At times, the sheer scope of the book can be offputting: early pages dedicated to the 'Anatomy of a Sine Wave' seem out of place and uninviting. However, for animators up to the challenge of designing their own sound, the information is here in abundance.

VERDICT
So superbly comprehensive that it oscillates between insightful, helpful and overwhelming **7**

DETAILS

FOR
Softimage XSI

PUBLISHER
3Dtutorial.com

PRICE
£38* / $69 / €57*
*Currency conversion

RUNNING TIME
11 hours 18 minutes

Getting Started With Scripting in Softimage XSI

While users have been crying out for training material covering scripting in *Softimage XSI* since day one, it has never arrived. However, 3Dtutorial.com has done a rather good job of filling this void. This training CD-ROM offers 11 hours of production-like examples, taking you through the creation of basic scripts and expressions to the more advanced scripted operators and particle events.
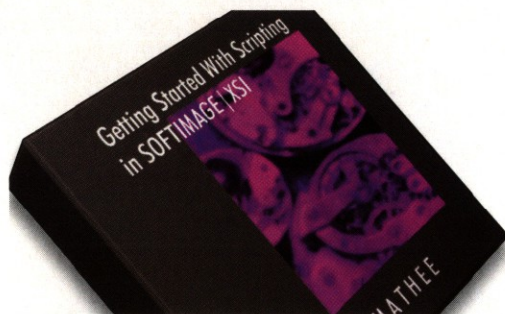
By showing a variety of possible uses of scripting in different areas of *XSI*, this product fully introduces you to its potential.

Given that the material is primarily aimed at artists still uninitiated to the world of scripting, perhaps the concepts could have been expounded further and more clearly. However, this and the lack of focus on *why* a script is written in a specific manner, rather than *how*, are the only real issues preventing this excellent release from gaining a higher score.

VERDICT
A comprehensive, if sometimes dry, introduction to scripting and its use in *Softimage XSI* **7**
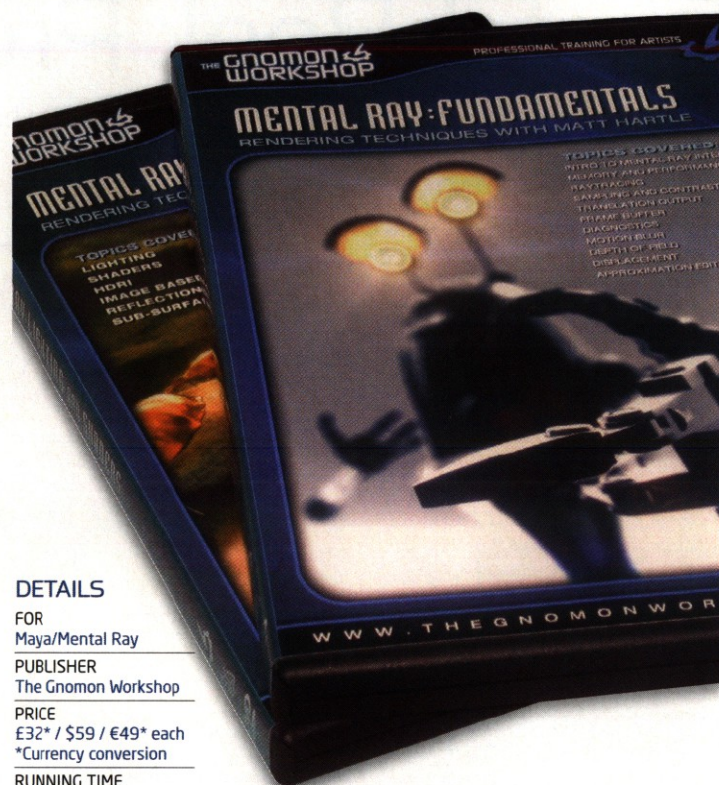
DETAILS

FOR
Maya/Mental Ray

PUBLISHER
The Gnomon Workshop

PRICE
£32* / $59 / €49* each
*Currency conversion

RUNNING TIME
3 hours 30 minutes

Mental Ray: Fundamentals and Mental Ray: Lighting and Shaders

Any software package is a little hard to get to grips with straight out of the box. *Mental Ray* is no exception, and many users are put off by talk of its steep learning curve.

Step in Matt Hartle and The Gnomon Workshop. The LA studio has released three titles in its *Mental Ray* range, the first two of which are reviewed here. As with all new Gnomons, the DVD is now a DVD-ROM, with more educational material and a much sharper image than DVD-Video. You'll need to download the *EnSharpen* codec to be able to play the video content.

Mental Ray is deep, but *Fundamentals* gets straight under the hood like a Haynes car manual. After a brief look at the interface and a lot of talk about frame buffers and sampling, it's time to see just what separates *Mental Ray* from the *Maya* render engine. In the first disc alone, you learn some theory and basic guidelines, then put it into practice with some depth of field, motion blur and displacement mapping for good measure.

Disc two takes you into the full realms of *Mental Ray*. Lighting and shaders can be daunting, but this DVD will show you the best way to use the renderer within *Maya*, and help you define a better workflow. You can see how stunning true HDRI-lit renders can be; how specific shaders can be used; how to make *Maya* fur actually look like fur; plus specialist techniques such as contour rendering (a boon for 'cartoony' or wireframe renders).

A nice touch is the fact that there are two great '101 lessons' at the end of the DVD, with instructor Sean Mills taking you through subsurface scattering. The video content is complemented by PDF-based lecture notes that you can print off and keep to hand. With all this under your belt, your renders should really start to reflect your new *Mental Ray* know-how.

VERDICT
A worthy addition to the range that makes you wonder why training schools still exist **8**

Buyer's guide

Whether you want advice on choosing a specific software package, or an overview of what's on the market, this database of past 3D World reviews contains the information you need to make the right buying decision

Online Resources
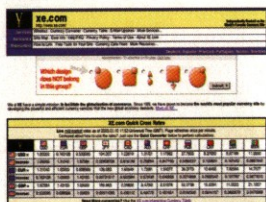
● This guide lists prices in Pounds Sterling and US Dollars. For a quick currency conversion: **www.xe.com**
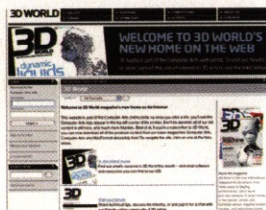
● For non-3D software, our new online portal holds a wide range of reviews: **www.3dworldmag.com**

When new 3D users contact the magazine, the most common question they ask is: "Which software package should I buy?" To which the honest response is: "That really depends on you."

Unlike Web design or 2D illustration, there's no single, well-established software package that all professionals use. Instead, choosing a 3D application is largely a matter of personal requirements, not to mention individual taste. Before you begin downloading demos, however, it does help to have a broad overview of what's available – and that's where this buyers' guide comes in.

In this guide, you'll find a list of the key software packages in a particular market sector, the issue of the magazine in which each one featured and a brief summary of the review. These summaries represent a single reviewer's opinion, but they should give you an idea of the key characteristics of each application.

QUESTIONS, QUESTIONS...

Before diving in, there are two fundamental questions you should ask. Firstly, are you pursuing 3D as a professional career? And secondly, what kind of 3D work do you aim to produce?

If the answer to the first question is 'no', the only limitations on your choice of 3D software are your budget and operating system. In the hands of a skilled user, inexpensive applications can generate impressive results, although they might not do so as quickly as more expensive software (or in a way that professional 3D artists would deem conventional).

If you do aim to make a living in 3D, however, you'd be well advised to pick a 'professional' application: those listed in the upper table on the page opposite. Expensive packages don't necessarily generate better results, but they tend to produce work quickly,

flexibly and reliably – all important issues if deadlines are looming. And while studios don't usually hire staff solely on the basis of the software they've used, mastering a 'name' application will familiarise you with high-end tools and increase your chances of freelance work.

Another consideration is whether you intend to produce animations or still images. As a crude generalisation, illustrators and graphic artists often favour pro applications at the lower end of the price scale, while those working in animation, visual effects or game design tend to opt for more expensive packages.

Ultimately, however, there's no substitute for hands-on experience. All major applications have demo versions that you can

CHOOSING APPLICATIONS IS ALL ABOUT PERSONAL REQUIREMENTS AND INDIVIDUAL TASTE

download and experiment with, and before you reject the more expensive packages, remember that many of them – particularly *Maya*, *Houdini*, *LightWave* and *Softimage XSI* – have free 'learning' editions. Educational deals also offer students the chance to buy full versions of professional software for the price of a handful of DVDs: to see if you qualify, check the website of the software package you're interested in.

Fortunately, there are very few 'bad' 3D packages on the market, so choosing the right one for you ultimately comes down to personal taste. Do your research, consult the magazine, and be prepared to experiment – but above all, enjoy yourself!

ALL-ROUND 3D PACKAGES (UNDER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AIST MOVIE 3D	PC	Cut-down version of *Realsoft 3D*, aimed mainly at home movie makers dabbling in 3D	£68* ($132*)	AIST	www.aist.com	N/A	[Not previously reviewed in *3D World*]	N/A
CARRARA 3D BASICS 2	Mac/PC	Extremely stripped-down version of a mid-price app, aimed at hobbyists and casual users	£69 ($99)	Eovia	www.eovia.com	N/A	[Not previously reviewed in *3D World*]	N/A
CARRARA 4 STANDARD	Mac/PC	Inexpensive all-rounder, lacking some of the high-end tools from *Carrara 4 Professional*	£209 ($279)	Eovia	www.eovia.com	60	Still a solid purchase for a novice all-round 3D user on a budget, *Carrara 4* fixes bugs from earlier versions, but lacks the new rendering tools of the *Pro* edition	8
GAMESPACE	PC	Cut-down *trueSpace* with extra games tools: aimed at modders and indie game developers	£154* ($299)	Caligari	www.caligari.com	46	Goes some way to providing a one-stop solution for the mod community, but one with rough edges on release: those on a real budget may stick to freeware	7
HASH ANIMATION:MASTER	Mac/PC	Cult entry-price animation app: chosen by many leading animators for personal work	£154* ($299)	Hash Inc.	www.hash.com	59	Powerful, intuitive rigging and animation package, complemented by a simple, versatile modeller. Now adds hair support and a sprite-based particle system	9
PIXELS 3D 5	Mac	The premier – and possibly sole – Mac-only 3D package: a cult app amongst Mac fans	£77* ($149)	Pixels Digital	www.pixelsdigital.com	42	Great value for money, and includes a number of high-end tools, including fluids and cloth. Good render quality, but very slow, and workflow could be improved	8
REALSOFT 3D 5 (FOR LINUX)	Linux	Even better value than the PC edition: most Linux users' main alternative to freeware	£136* ($245*)	Realsoft Graphics	www.realsoft.com	35	[Reviewed at version 4] Excellent render quality, but more suited to still images than animation, particularly character animation. OpenGL could be improved	9
SHADE 7 DESIGNER LE	Mac/PC	Very inexpensive, if limited, all-round package: extremely popular with hobbyists in Japan	£56* ($109)	Curious Labs	www.curiouslabs.com	58	Clearly geared towards the student or amateur, this cheap and cheerful version of its bigger siblings shares the basic modelling tools but is otherwise limited	7
SHADE 7 STANDARD	Mac/PC	Mid-level edition: more expensive than LE, but lacks some key tools of *Shade 7 Pro*	£107* ($209)	Curious Labs	www.curiouslabs.com	58	Similar in toolset to the *Professional* edition, but lacks automatic smoothing and interpolation. A reasonable buy, if you can handle the translation issues!	7

ALL-ROUND 3D PACKAGES (OVER £250)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3DS MAX 7.5	PC	Long-established 3D package: still a standard in the games and architecture industries	£2,695 ($3,495)	Autodesk	www.autodesk.com	66	A solid half-point release – although only available to subscribers – 3ds Max 7.5 adds hair and fur, architectural features and better mental ray rendering	8
CARRARA 4 PRO	Mac/PC	Inexpensive all-round app, now targeted more specifically at professional illustrators	£419 ($579)	Eovia	www.eovia.com	60	Retains Eovia's unique – and possibly offputting – system of workflow divided into 'rooms', but dramatically improves animation and high-end rendering	8
CINEMA 4D 9 BASE	Mac/PC	Entry-level edition only: some important tools must be purchased as add-on modules	£425 ($695)	Maxon	www.maxon.net	58	Not as ground-breaking an upgrade as version 8, but builds on previous incarnations to deliver a capable all-round professional 3D package	9
CINEMA 4D 9 XL	Mac/PC	A powerful renderer makes this increasingly respected app the choice of many illustrators	£1,148 ($1,895)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Pricier than LightWave, but the MOCCA and Advanced Render modules are essential to many pro artists	9
CINEMA 4D 9 STUDIO	Mac/PC	Top-level edition of Cinema 4D, adding in BodyPaint 2 and unlimited network rendering	£1,871 ($2,995)	Maxon	www.maxon.net	58	[This edition not specifically reviewed in 3D World] Primarily for large facilities needing unlimited render licenses, although BodyPaint is a useful added extra	9
EIAS 6	Mac/PC	16-year-old animation package; a workhorse in the film and broadcast graphics industries	£514* ($895)	EI Technology Group	www.eitechnologygroup.com	70	Its strong cult following will appreciate this superb upgrade, with faster OGL response. No built-in modeller, but now comes with Silo 1.4. Still a bit pricey	7
HOUDINI 7 MASTER	PC/Linux	Powerful procedural animation package: few skilled users, but a staple of much VFX work	£8,769* ($17,000)	Side Effects Software	www.sidefx.com	41	[Reviewed at version 6] Retains all the power of previous versions, but makes considerable advances in terms of ease of use. Also adds GI rendering	8
LIGHTWAVE 3D 8	Mac/PC	Another long-established package, used in a wide range of work, notably TV effects	£440* ($795)	NewTek	www.newtek.com	53	Vastly improves character animation and dynamics, and streamlines workflow, but leaves the renderer and underlying structural problems of the app untouched	8
MAYA 7 COMPLETE	Mac/PC/Linux	An affordably priced edition of Maya for many 3D markets – and far meatier than version 6.5	£1,449 ($1,999)	Alias	www.alias.com	70	Alias has listened to users' requests with this version, and Maya 7 Complete in particular raises its game with polygon updates, a new Toon Shader and more	9
MAYA 7 UNLIMITED	Mac/PC/Linux	Powerful all-rounder, a favourite for film effects work – and its toolset just got better	£4,899 ($6,999)	Alias	www.alias.com	70	A massive, games-oriented upgrade that will also please TV and film users, with enhancements to Fur and Hair dynamics, plus the Cloth and Live toolset	9
REALSOFT 3D 5 (FOR PC)	PC	Underpublicised, but well-regarded, mid-priced application: good built-in renderer	£415* ($795*)	Realsoft Graphics	www.realsoft.com	61	Enhanced Sub-D modelling and texturing make this a viable alternative to better-known 3D illustration apps. Still weak at character animation, however	9
SHADE 7 PRO	Mac/PC	Very popular Japanese package. Still relatively unknown in the West, but may gain ground	£521* ($1,009)	Curious Labs	www.curiouslabs.com	58	Robust modelling tools and a reasonably powerful renderer, but the interface and animation tools will seem unconventional to many Western 3D artists	7
SOFTIMAGE XSI 5 FOUNDATION	PC/Linux	Aggressively marketed entry-level edition of a leading 3D app: very powerful for the price	£299 ($495)	Softimage	www.softimage.com	70	Fuller-featured than many entry-level editions of major packages, Foundation – originally sold for $1,995 – sets a new benchmark for 3D software pricing	9
SOFTIMAGE XSI 5 ESSENTIALS	PC/Linux	Powerful, well-balanced all-round package whose lower price represents better value	£1,125 ($1,995)	Softimage	www.softimage.com	70	Powerful upgrade. Handles 64-bit, loads of data (thanks to its gigapolygon architecture) and boasts a fast, state-of-the-art physics simulation engine	9
SOFTIMAGE XSI 5 ADVANCED	PC/Linux	Widely used in games and VFX, but struggles for market dominance with 3ds Max and Maya	£3,950 ($6,995)	Softimage	www.softimage.com	70	XSI 5 Advanced is for power users. Includes the Behavior 2.1 crowd animation system, Syflex 3 cloth and flesh simulator, plus extra satellite render licences	9
STRATA 3D CX	Mac/PC	Long-established, if relatively niche, mid-price 3D package: now targeted at illustrators	£346* ($695)	Strata	www.strata.com	55	A capable, if idiosyncratic, package for a print graphic artist looking to team Photoshop and Illustrator with a little 3D. Far weaker for animation, however	7
TRUESPACE 6.6	PC	Another fixture in the increasingly crowded mid-price 3D software market; still widely used	£310* ($595)	Caligari	www.caligari.com	38	Improving animation and dynamics, version 6.6 addresses many of trueSpace's shortcomings, but the current interface now looks to have reached its limits	8
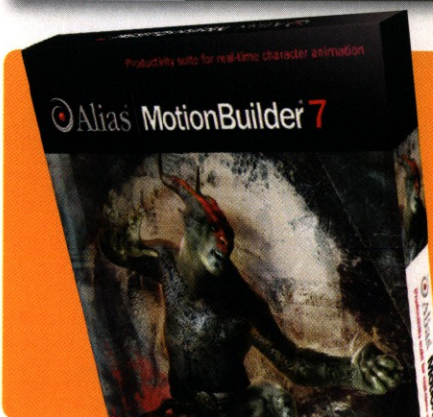
TALKING POINT | A question of neutrality

IF YOU WORK in character animation, you probably wonder how you ever managed without MotionBuilder. Used to speed up the process of cleaning, editing and retargeting keyframe and mo-cap animation data, the package's early selling point was that it was platform-independent, playing equally happily with Maya, 3ds Max or XSI. In fact, so ubiquitous did it become, particularly for games, its FBX file format is now the standard for motion data. However, in 2004, MotionBuilder was acquired by Alias, and with version 7, its feature set has begun, ever so gently, to converge with Maya. So how will users of other software react? You can find out what 3ds Max artist Chris Ollis thought in this month's reviews section. MotionBuilder 7 is reviewed on page 82

TEXTURING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BODYPAINT 3D 2	Mac/PC	Powerful specialist 3D painting package, used on increasingly high-profile VFX projects	£425 ($745)	Maxon	www.maxon.net	47	Much quicker and simpler to use than the first release, and results can be stunning. Rock solid and well documented, but one for specialist texture artists	9
GENETICA 2 PRO	PC	Create an infinite variety of seamlessly tileable textures with minimal effort	£228 ($399)	Spiral Graphics	www.spiralgraphics.biz	69	An asset for busy professionals, Genetica 2 is a versatile and easy-to-use application. You can also create bump maps, although not animated textures	8
PAINT SHOP PRO 9	PC	Inexpensive 2D painting and bitmap editing app, unfairly regarded as 'just for hobbyists'	£99.95 ($129)	Corel	www.corel.com	57	Fantastic value for money, and version 9 adds a proper History palette. Does nearly anything that Photoshop can, but needs better alpha channel support	9
PHOTOSHOP CS2	Mac/PC	The de facto standard for texture painting and image manipulation amongst CG artists	£523 ($599)	Adobe	www.adobe.com	68	Still de rigueur for pro 3D work, with enough enhancements – such as support for HDR images and the Smart Objects feature – to make this the best version	9

MODELLING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AMAPI DESIGNER 7	Mac/PC	Long-established modelling package, boasting a unique workflow and interface	£339 ($479)	Eovia	www.eovia.com	40	A powerful modelling package, particularly for organic objects, although users will either love or loathe the interface, and documentation could be improved	9
AMAPI 7.5 PRO	Mac/PC	*Amapi Designer's* new bigger sibling, intended as a serious alternative to pricier applications	£559 ($779)	Eovia	www.eovia.com	62	Professional version of *Amapi*, aimed at industrial modelling. Superb Dynamic Geometry and better NURBS modelling but tool/command validation is tricky	9
FORM•Z 5	Mac/PC	Powerful, long-established all-round modeller, used on a wide range of industrial projects	£794* ($1,495)	Auto•des•sys	www.formz.com	63	This is a premium modelling package – a hybrid solid and surface modeller. With strong NURBS tools and decent renderer, it has a steep learning curve	8
MODO	Mac/PC	Powerful, customisable and Mac-friendly new Sub-D modeller, created by ex-NewTek staff	£359* ($695)	Luxology	www.luxology.com	60	A relatively pricey addition to a crowded market sector, but one with a uniquely customisable modular design. Some early stability issues, but improving rapidly	8
SILO	Mac/PC	New specialist Sub-D modelling package: inexpensive, and improving with every build	£56* ($109)	Nevercenter	www.nevercenter.com	55	Has evolved into a promising app, following early stability issues. Quirky UV mapping, but good crossover between Sub-D and poly tools, and customisable	9
SKETCHUP 5	Mac/PC	Architectural modeller that's fast and fun to use, with a unique sketching workflow	£315 ($570*)	@Last Software	www.sketchup.com	70	Sketching package, architectural tool and 3D modeller, rolled into one affordable tool. Great new 3D terrain toolset and layer manager, but no standard lights	8
SOLIDTHINKING DESIGN 6.5	Mac/PC	A thankfully uncomplicated NURBS modelling tool for professional 3D artists	£1,579* ($2,745)	solidThinking Ltd	www.solidthinking.com	69	A somewhat expensive, though outstanding, NURBS modeller that has the shallowest of learning curves for absolute beginners	9
ZBRUSH 2	Mac/PC	Powerful, intuitive organic modelling package currently gaining very strong word of mouth	£252* ($489)	Pixologic	www.zbrush.com	53	A new interface helps redefine *ZBrush 2* as a professional 3D sculpting tool. Still some quirks, but many unique tools and capable of handling millions of polys	9

CHARACTER AND FACIAL ANIMATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
DAZ STUDIO	Mac/PC	Long-awaited new rival to *Poser*, currently still available as a free public beta	Free	DAZ Productions	www.daz3d.com	N/A	[Not previously reviewed in *3D World*]	N/A
ENDORPHIN 2	PC	Innovative motion synthesis system using AI 'actors' to generate artificial mo-cap data	£7,995 ($12,795)	NaturalMotion	www.naturalmotion.com	67	Brilliant, technically accomplished, and fun to use, to boot. Generates data no real-world stuntman could achieve. Uses unique AI-powered virtual stuntmen	9
FACESTATION 2	PC	Turn video footage of an actor's face into instant animation: for *3ds Max* and *Maya*	£1,041* ($1,995)	Digimation	www.digimation.com	33	Fast facial tracking, and can work with real-time capture. Resource hungry, however, and the quality of the results is only as good as your morph targets	8
LIFESTUDIO:HEAD 2.5 STANDARD EDITOR	PC	Customise a pre-built head model, apply instant lip synch and export as OBJs or an AVI	£310 ($599*)	LifeMode Interactive	www.lifemi.com	44	Good texturing tools, but some tweaking is required to finesse the lip synch generated automatically from an audio track. Manual and UI need tidying up	8
LIFESTUDIO:HEAD 2.5 PRO ARTIST	PC	Create and rig facial models for *3ds Max* and *Maya*, then apply instant lip-synching	£990 ($1,914*)	LifeMode Interactive	www.lifemi.com	44	As the *Standard Editor*, but with the power to import/export directly to *Maya* or *3ds Max*. One of the first proper tools of this kind: a time-saver for games artists	8
MESSIAH:ANIMATE 5	PC	Powerful standalone animation package, also available as a plug-in for major 3D packages	$125* ($239)	pmG Worldwide	www.projectmessiah.com	29	[Reviewed at version 3] A comprehensive character animation solution with very fast IK and deformation and powerful expressions. Now reduced in price	8
MESSIAH:STUDIO 2	PC	*messiah:animate's* larger parent product, adding in full rendering capabilities	£518* ($995)	pmG Worldwide	www.projectmessiah.com	58	Not an industry-standard application (and lacks modelling tools), but offers intuitive, fast and powerful GI rendering and is capable of some amazing results	7
MOTIONBUILDER 6 STANDARD	Mac/PC	Innovative 'motion design' package, originally developed by Kaydara: now owned by Alias	£532* ($995)	Alias	www.alias.com	46	[Reviewed at version 5] Powerful FK/IK blending and real-time playback, plus a new Story Window to keep things organised. Quickly becoming indispensable	9
MOTIONBUILDER 6 PRO	Mac/PC	Pro motion-editing app: an industry standard for blending mo-cap and keyframe data	£2,244* ($4,195)	Alias	www.alias.com	52	High-end tools include mo-cap data editing and data retargeting. It might be a tad expensive, but it's probably the best character animation tool around	8
POSER 6	Mac/PC	The original figure-posing application, also used for pre-viz and simple animation work	£157 ($249)	Curious Labs	www.curiouslabs.com	55	Despite a few niggles, well-chosen workflow enhancements and a lot of new content make *Poser 6* a vital upgrade. Still undisputed champ in its market sector	8
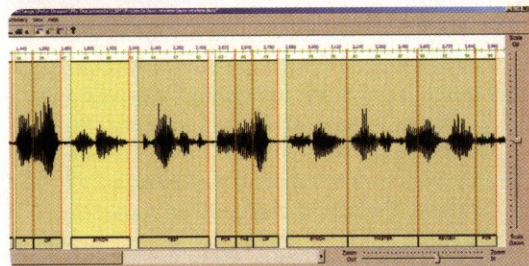
TALKING POINT | Read my lips

WHILE FEW ARTISTS would use the results without some clean-up work, automated lip-sync packages provide a quick way of using recorded dialogue to generate facial animation of a quality suitable for less demanding situations, or as a basis for refining by hand. The new kid on the block is Letterbox Animation Studios' *LipSync Master* - but how will it fare against old hands like *Mimic*, *Magpie Pro*, and the *3ds Max* plug-in *Voice-O-Matic*? **LipSync Master is reviewed on page 89**

RENDERING (packages previously reviewed in 3D World only)

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ARTLANTIS R	Mac/PC	Affordable renderer built on *Artlantis*, aimed at the architectural visualisation market	£345 ($595)	Abvent	www.abvent.com	70	Fast, value-for-money tool offering one-click radiosity. Users switching from *Artlantis 4.5* lose animation controls – soon to be available in *Artlantis Studio*	8
FINALRENDER STAGE-1	PC	Another powerful *3ds Max* renderer, often used in architectural visualisation work	£415* ($795)	Cebas	www.finalrender.com	43	Powerful new HyperGI engine and caustics tools, but exceptional results require a lot of tweaking. Some instabilities, particularly in distributed renders	7
RENDERMAN FOR MAYA	Mac/PC	Pixar's new, fully integrated renderer for *Maya*, targeted primarily at smaller studios	£550* ($995)	Pixar	https://renderman.pixar.com	70	Only runs on one processor, but it's stunning, up to 10 times faster than *Mental Ray*, fairly inexpensive and it rocks with particles – a must-have plug-in	9
TURTLE	Mac/PC/ Linux	Third-party *Maya* renderer, designed to offer a new balance of speed and image quality	£619* ($1,199)	Illuminate Labs	www.illuminatelabs.com	55	Blisteringly fast raytrace rendering. Currently best suited to architectural work, due to lack of support for particles and Paint Effects, but developing rapidly	7

LANDSCAPE GENERATION

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
BRYCE 5.5	Mac/PC	The original landscape generator: now back in development after several years in limbo	£70* ($110)	DAZ Productions	bryce.daz3d.com	68	Not the most powerful app on the market, but a very affordable one. *Bryce* is easy to use, and 5.5 offers faster rendering and extended OpenGL support	9
MOJOWORLD 3	Mac/PC	Unusual landscape-generation app with a unique emphasis on creating entire planets	£103* ($199)	Pandromeda	www.pandromeda.com	60	A unique approach to landscape generation that tends to polarise opinion. Great tools, but hard to control fine details and the interface can be frustrating	6
VUE 5 ESPRIT	Mac/PC	Landscape generation's current market leader: high-quality results at an affordable price	£171 ($249)	e-on Software	www.e-onsoftware.com	59	Rightly the best-selling landscape generator: very realistic results, and easy to master. New GI rendering is slow, however, and still no proper animated water	9
VUE 5 PRO STUDIO	Mac/PC	The *Vue 5 Esprit* core, augmented by four add-on modules (also purchasable separately)	£274 ($399)	e-on Software	www.e-onsoftware.com	65	A well-rounded set of add-ons. Although some features should arguably be in the core app, *Mover* (Poser import) and *Botanica* (plant editing) are of real value	8
VUE 5 INFINITE	Mac/PC	Pro-level edition of Vue, aimed at architectural and VFX work. Formerly known as *Vue 4 Pro*	£411 ($599)	e-on Software	www.e-onsoftware.com	66	Powerful, intuitive and configurable, *Vue 5 Infinite* leads where other landscape apps dare not follow. Relatively pricey, but capable of incredible-quality results	8
WORLD CONSTRUCTION SET 6	Mac/PC	Technical , but very powerful package: well suited to tasks requiring real-world accuracy	£258* ($500)	3D Nature	www.3dnature.com	13	[Reviewed at version 5] A versatile and comprehensive landscape program, but the interface is unintuitive with a steep learning curve and no simple mode	8
WORLDBUILDER GENESIS	PC	A popular alternative to the *Vue* family: more powerful than *Bryce*, less technical than *WCS*	£92* ($179)	Digital Element	www.digi-element.com	57	Beautiful end results, and fairly easy to use. Now very much optimised for 3ds Max, though, while some of the new features and the tutorials lack polish	7
WORLDBUILDER PRO 4	PC	Higher-end edition of *WorldBuilder*, tailored to pro graphics artists rather than hobbyists	£360* ($699)	Digital Element	www.digi-element.com	57	A terrific program with many unique features, particularly for plant and water animation, and great user control over fine detail – but see reservations above	7

COMPOSITING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
AFTER EFFECTS 6 STANDARD	Mac/PC	One of the most popular desktop compositing packages, usable even for broadcast work	£565 ($699)	Adobe	www.adobe.com	47	Updated video painting features, plus the addition of *Photoshop*'s Liquefy tool make for a major upgrade. Still the same cluttered old interface, however	8
AFTER EFFECTS 6 PROFESSIONAL	Mac/PC	As *After Effects Standard*, plus some high-end tools: worth investing in for professional work	£915 ($999)	Adobe	www.adobe.com	47	Motion tracking, enhanced keying and masking, particle systems and 16-bit colour space tools make this a better option than *AE Standard* for serious work	8
COMBUSTION 4	Mac/PC	Autodesk's own desktop compositor: unsurprisingly often teamed with *3ds Max*	£850 ($995)	Autodesk	www.autodesk.com	65	Very strong basic tools, well-organised workflow and good compatibility with 3D apps, but poorer editing app integration and a relatively steep learning curve	9
DFX+ 4	PC	Cut-down, modular version of *Digital Fusion*, much beloved of PC-based *LightWave* artists	Priced by module	eyeon Software	www.eyeonline.com	43	Most of the improvements in version 4 are cosmetic, but still a powerful, affordable, node-based compositing app. Good visual effects and 3D tools	8
DIGITAL FUSION 4	PC	One of the first PC-based desktop compositing packages, but still relatively little known	£2,579* ($4,995)	eyeon Software	www.eyeonline.com	43	Not limited to 8-bit colour space, unlike *DFX+*, making this a powerful – and underrated – PC-based compositor, capable of scaling to film-quality work	8
SHAKE 3.5	Mac/Linux	Powerful node-based desktop compositor, used even in film and broadcast effects	£2,099 ($2,999)	Apple	www.apple.com	54	The most powerful desktop compositor on the market, with the possible exception of *Digital Fusion*. Version 3.5 adds long-awaited morphing tools	8

CAMERA TRACKING AND MATCH MOVING

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3D-EQUALIZER 3	Mac/Linux	Venerable (and Oscar-winning) tracking package, still widely used in film effects	On request	Science-D-Visions	www.3dequalizer.com	N/A	[Not previously reviewed in *3D World*]	N/A
BOUJOU 3	Mac/PC/ Linux	One of the first major alternatives to *3D-Equalizer*, popular in the effects world	£5,190* ($10,000)	2d3	www.2d3.com	64	Version 3 is still a powerful tracking package, but this much-delayed and largely unsurprising update may prove a disappointment to long-term *boujou* users	6
BOUJOU BULLET	Mac/PC/ Linux	Cut-down, wizard-driven version of *boujou*, intended for small to medium-sized facilities	£1,307* ($2,500)	2d3	www.2d3.com	64	Aimed at smaller post facilities, *bullet* has good basic 2D and 3D tracking and accepts any resolution footage, but can prove unreliable with zoom shots	7
MATCHMOVER PRO 3.1	Mac/PC/ Linux	Another of the old guard of desktop tracking applications, recently reduced greatly in price	£2,062* ($3,500)	RealViz	www.realviz.com	63	A highly evolved version of the software, with powerful 2D and 3D tracking tools. No optical flow facility, however, and the mo-cap module costs a lot extra	7
PFHOE	Mac/PC	A powerful low-cost DV tracking application, named by *3D World* readers (see issue 61)	£49 ($94*)	The Pixel Farm	www.thepixelfarm.co.uk	62	With fast and robust auto-tracking, *PFHoe* is great value for money and ideal for its target audience of aspiring digital filmmakers and independent artists	9
PFMATCH	Mac/PC	*PFTrack*'s younger sibling, offering a useful range of tracking tools at an entry-level price	£600 ($1,160)	The Pixel Farm	www.thepixelfarm.co.uk	57	Great price, although only broadcast-resolution footage in AVI and QT formats is supported. Good user control in version 1.5, but no proxy-resolution tracking	8
PFTRACK 3	Mac/PC/ Linux	First of a new generation of lower-priced broadcast-quality camera tracking packages	£3,000 ($5,000)	The Pixel Farm	www.thepixelfarm.co.uk	66	Fast, powerful, and now boasting true object tracking, *PFTrack 3* is arguably the most complete, and completely useful, tracking system currently availalble	9
SYNTHEYES	Mac/PC	Astonishingly affordable new all-round tracking package, gaining good word of mouth	£180* ($349)	Andersson Technologies LLC	www.ssontech.com	49	An incredible range of tools for the price. Outperforms costlier rivals on many tasks, but workflow can feel counter-intuitive for those used to other apps	9

TALKING POINT | CAD vs DCC

3D WORLD FOCUSES primarily on the entertainment, or 'DCC', market. However, CAD is a huge sector of the 3D industry, and CAD/CAM software is often also used to generate models for import into DCC packages. *TurboCAD*, reviewed this issue, falls at the cheaper end of the market. So how does it compare to more expensive rivals, such as *AutoCAD* or *VectorWorks*? **TurboCAD Pro 11 is reviewed on page 90**

WEB 3D AND MULTIMEDIA

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
ANARK STUDIO 3	PC	Established authoring package for interactive 3D presentations	£1,835* ($3,499)	Anark	www.anark.com	64	A powerful solution for large-scale, real-time 3D, but the new higher price and absence of Mac support will leave some existing users high and dry	8
AXELEDGE 2	Mac/PC	All-in-one authoring and online animation package, described as 'like Flash in 3D'	£309* ($595)	MindAvenue	www.mindavenue.com	33	Powerful all-round authoring package, with good animation and interaction editing tools. Import and export options much improved in version 2.0	8
CULT3D	Varies	Free software suite for exporting 3ds Max and Maya models in interactive online format	Free	Cycore	www.cycore.com	12	[Reviewed using the 3ds Max exporter] Relatively straightforward to use, with a good range of options in the exporter. Very much more stable in recent builds	7
DIRECTOR MX 2004	Mac/PC	De facto standard for authoring multimedia CDs/DVDs: now incorporating simple 3D tools	£809 ($1,099)	Macromedia	www.macromedia.com	37	Greatly improved layout, but few new 3D tools since version 8.5. Havok physics and useful web output tools, but programming needed for complex effects	7
QUEST3D 2.1 ENTERPRISE	PC	Real-time 3D authoring tool, also available in cheaper Lite and Professional editions	£1,035* ($1,999)	Act-3D	www.quest3d.com	48	Full-featured all-round authoring app, but fairly easy to master: no programming required. Can become unmanageably cluttered on complex projects, though	8
SWIFT 3D 4.5	Mac/PC	3D to vector graphics conversion tool: one of the most regularly updated interactive 3D apps	£128* ($229)	Electric Rain	www.erain.com	68	Version 4.5 of this 3D-to-Flash application offers up to a 50-fold increase in render speed over version 4, plus a major overhaul of the vector render engine	8
WIREFUSION 4 ENTERPRISE	Mac/PC/ Linux	Visual authoring tool for interactive 3D content: also available in cheaper editions	£1,195 ($1,995)	Demicron	www.demicron.com	56	Straightforward all-round authoring solution: no need for programming or specialist plug-ins to view output. Slightly unorthodox, but quick to master	8

OTHER TOOLS

PRODUCT	FORMAT	DESCRIPTION	PRICE	DEVELOPER	WEBSITE	ISSUE	VERDICT	SCORE
3DSOM PRO	PC	Image-based modelling software for creating 3D models from multiple photographs	£1,495 ($2,702*)	Creative Dimension Software	www.3dsom.com	70	Requires photos of an object against a marker grid, like D Sculptor or iModeller. Its first upgrade since 2003 offers great automasking and automatic texturing	7
ANTICS PRE-VIZ	PC	A new real-time pre-visualisation tool for production, with a simple learning curve	£570 ($995)	Antics Technologies	www.antics3d.com	69	A solid, intuitive pre-production tool, simple enough for even producers to use! Advanced functionality is still slightly fiddly, but the supporting tutorials are good	8
D JOINER	PC	Photo-stitching software: less widely known than Stitcher, but suitable for many projects	£300 ($575*)	D Vision Works	www.d-vw.com	20	In good hands, it does what it's meant to do. But it suffers from poor usability and a lack of automated features. Documentation is disappointingly slim too	7
D SCULPTOR 2 STANDARD	PC	Image-based modelling software: another mid-priced package, aimed at home users	£500 ($960*)	D Vision Works	www.d-vw.com	11	[Reviewed at version 1] A good tool for creating 3D models from images, and cheaper than ImageModeler. Much slower and not as powerful, however	8
DEEP EXPLORATION 3.5	PC	File conversion software: capable of tackling a wide range of file formats, including CAD	£77* ($149)	Right Hemisphere	www.righthemisphere.com	45	Well-designed model viewer, file conversion and asset management utility. Includes basic 3D model editing tools, rendering and Shockwave output	8
FRAMEFORGE 3D STUDIO	Mac/PC	Storyboarding software: first of a new wave of apps aimed at previz and 3D storyboarding	£180* ($349)	Innoventive Software	www.frameforge3d.com	55	Extremely easy to use, and scales to even high-budget movies. Specialised props only available as add-on packs, though, and complex scenes can be sluggish	9
IMAGEMODELER 4	Mac/PC	Image-based modelling software: one of the earliest desktop photogrammetry packages	£712* ($1,380)	Realviz	www.realviz.com	59	Gives professional-quality results, and can cope with architectural-sized objects, but requires considerable user input. Quality also comes at a price	7
IMODELLER 3D 2.5 WEB	Mac/PC	Image-based modelling software: creates 3D models for online use, in a Java-based format	£70* ($134*)	UZR	www.imodeller.com	58	Like the pro version but cheaper. With the right objects, this can produce quite impressive results. Wait until the release of version 3, which supports concavity	6
IMODELLER 3D 2.5 PRO	Mac/PC	Image-based modelling software: all-purpose app, exporting to a range of 3D file formats	£352* ($675*)	UZR	www.imodeller.com	58	Impressive and more powerful than its main rival, D Sculptor, it has too many irritations. It may be easy to learn, but it's quirky and frustratingly unstable	6
NUGRAF 4.1	PC	File conversion software: powerful, with support for batch conversion and CAD data	£256* ($495)	Okino	www.okino.com	21	[Reviewed at version 4] This affordable package performs a demanding task exceptionally well and is relatively affordable. User interface is a tad dated	8
PARTICLEILLUSION 3	Mac/PC	Particle software: generates 3D-style effects in 2D. Niche, but used on many pro projects	£206* ($399)	Wondertouch	www.wondertouch.com	41	A fast, flexible alternative to conventional 3D particle effects, and fits well into production pipelines. Would be improved by more specific forces and user control	8
REALFLOW 3	Mac/PC/ Linux	Fluid simulation software: the current market leader for realistic fluids, used in film projects	£520* ($1,200)	Next Limit	www.nextlimit.com	60	Sets the benchmark for power and controllability for fluid-simulation systems, but at a price. Still some stability and UI issues, particularly in the Mac version	7
STITCHER 4	Mac/PC	Photo-stitching: the leader in its field, though similar tools are now present in Photoshop	£299* ($580)	Realviz	www.realviz.com	50	Incredibly powerful and versatile. Not a quick solution, but stands above the competition in quality of results, although that quality comes at a price	7
STORYVIZ	PC	Previsualisation software: the latest in a new wave of previz and storyboarding apps	£1,858* ($3,600)	Realviz	www.realviz.com	60	Far more flexible and open-ended than simple storyboarding apps, and includes a timeline and keyframe animation capabilities. A serious investment, however	8

CONTACT US | Have we missed anything?

THINGS CAN CHANGE very quickly in the world of 3D software. If you've spotted an error in this buyer's guide, please contact us at the email address below. However, before writing in, please bear the following points in mind:

1. All prices exclude VAT and shipping, plus any optional extra costs, such as printed manuals or maintenance contracts.
2. Asterisks denote currency conversions from a list price at the current rate of exchange when the entry was added to the buyer's guide.
3. Due to limitations of space, not all sectors of the 3D market can be covered each issue. We aim to vary our listings from month to month.
4. Space also precludes us from listing the thousands of plug-ins currently available.
5. The verdict column contains a synopsis of our last published review. In most cases this will refer to the current version of the software. Where this is not so, it should be clearly noted.

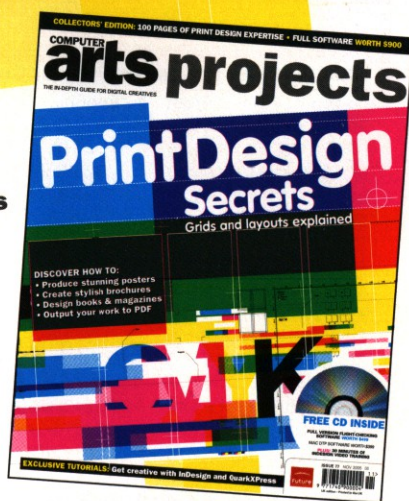**To notify us of an error in this buyers' guide, contact us at: 3dworld@futurenet.co.uk**

Print Design
Secrets
Grids and layouts explained

CMYK

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ISSUE 77
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13 OCTOBER

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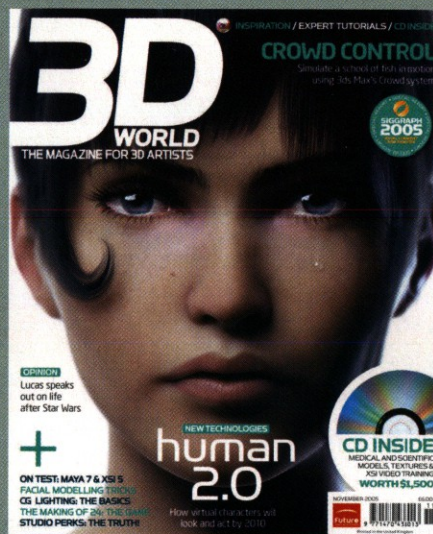
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HUMAN 2.0
November 2005**
The technology behind next-generation artificial life; George Lucas speaks out; Create a flocking simulation with *3ds Max*; *Maya 7* is reviewed
ON THE DISC
Zygote medical and scientific models; *T-Splines* (Learning Edition)

**ISSUE 69
THE ART OF ANIME
October 2005**
Recreate this cover – *Poser* masterclass and model on the CD; The making of *Advent Children*; 20 years of Japanese animation; The secrets of Studio Ghibli
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New *Poser 6* demo, *DAZ* 3D anime figures, clothing and morphs worth $120
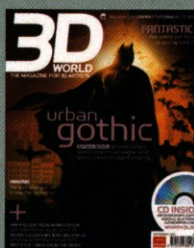
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CLASSIFIEDS

studio profile

FURIOUSFX

Information for artists seeking work at 3D studios. This month: **FuriousFX**

BASED
Burbank, California, US

PREVIOUSLY WORKED ON
• *Mr & Mrs Smith* (2005)
• *Spider-Man 2* (2004)

HR CONTACT
Erika Abrams, erika@furiousvfx.com

URL
www.furiousvfx.com

TYPE OF WORK UNDERTAKEN
Creative visual services for film and television containing 3D effects and animation, in conjunction with complex 2D compositing capabilities

NUMBER OF FULL-TIME EMPLOYEES
11

TYPICAL NUMBER OF FREELANCERS
Usually varies between one and four

TYPICAL NUMBER OF FULL-TIME RECRUITS PER YEAR
Four in 2005

LOOKING FOR USERS OF WHICH 3D SOFTWARE?
• *Shake*
• *Combustion*
• *Photoshop*
• *Maya*
• *RenderMan*
• *Mental Ray*
• *3D-Equalizer*

KEY SKILLS FOR EMPLOYEES
Excellent communication and organisational skills, along with attention to detail. Technical understanding of the hardware and software packages required for any given job, and the ability to work with others to gain new information while resolving issues

DESIRABLE SKILLS FOR EMPLOYEES
Collaborative and creative approach to projects. Ability to accept constructive review of work from internal supervisors and clients. Team player who presents themselves professionally

A TYPICAL EMPLOYEE AT FURIOUS FX IS...
Dedicated to the quality of their work, self-motivated and responsible for their contribution to the successful completion of projects in a timely manner

CURRENTLY HIRING FOR...
Strong compositors and 3D generalists

MAXIMUM LENGTH OF DEMO REELS
3-5 minutes

PREFERRED FORMAT FOR DEMO REEL SUBMISSIONS
DVD, VHS, *QuickTime* or online

IN ISSUE #72

A TO Z

8 NOVEMBER 2005

BUSINESS END

Each issue, our panel of experts answers the legal and financial questions of freelancers and small studios. This month, we ask...

"What are my moral rights?"

Q I'm currently working on a freelance project, but I'm not sure if the model I'm making is going to be used for 'civilised' purposes. Do I have the right to ask what the model is for? If I'm right about this, and I don't want to be associated with this kind of project, can I withdraw my services and artwork? Do digital artists have any specific rights relating to inappropriate use of their work?
DAN B, VIA EMAIL

A Interesting question, and one that's asked a lot. What you're talking about, essentially, are your moral rights. In the UK, this set of rights is related to copyright and design rights, but it also exists as a completely separate body. Moral rights are split into different areas: the right of paternity, the right of integrity and the false attribution of ownership. Your issue concerns the first two rights.

The key point to bear in mind is that, as the author of a work, you own the moral rights of the piece. However, it isn't quite this simple in reality, because to enforce this right, you need to have originally asserted it. If you haven't previously been identified or named as the author of the work, it will be difficult for you to assert your moral rights.

Take a look at the contract you've signed with your client. If, for example, you have assigned all copyright and related rights (design rights, for example) and you have waived your moral rights, you won't be able to prevent the intended work from going ahead. However, if you have assigned your copyright and related rights to the client, but not waived your moral rights, you're still in a position to use them, assuming that you have asserted them at some point during the contract. You will need to look over the fine print again to make sure that you haven't waived your moral rights. If you have, there's nothing you can do but sit back and watch your work be used for uncivilised purposes (you haven't spelt out what you mean by this phrase, but I will deal with this in more detail below).

Assuming that you haven't waived your moral rights, what is actually enforceable, and what can you do? First, the right of paternity is the right to be identified as the author (or director, in certain cases) of the work. This right is personal to you and cannot be assigned (transferred), which is why a well-drafted agreement will ask you to waive all claim to such rights.

The right that will interest you most, though, is the right of integrity. This is a right that an author has (or director, in limited circumstances), allowing he or she to prevent the work from being subjected to derogatory (or uncivilised) treatment. The question here is what constitutes derogatory treatment? This is a subjective matter and depends very much on the circumstances in which the work appears and the type of treatment it's given. Your situation isn't presented in detail, but assuming that you haven't waived your moral rights, you may be able to use the right of integrity to prevent your work from being used in an uncivilised manner.

You should also consider your contractual position. Was there anything said or spelt out indicating that the project would be very different to the final picture? If so, and you're able to provide evidence of what was said before you entered into the contract, you may be able to claim misrepresentation. You could argue that there's no contract between you, because had you known the true purpose of the contract, you would not have entered into it.

Conversely, was there anything about the project (its name or codename, for example) that put you 'on notice' (legal speak for 'which made you aware') that the project would turn out to be uncivilised? Assuming again that you haven't waived your moral rights, you should sit down with whoever commissioned you (the publisher of a game, perhaps?) and talk through your concerns. If you believe there has been a misrepresentation, you will have a

AS THE AUTHOR OF A PIECE OF WORK, YOU OWN THE MORAL RIGHTS

right to bring a claim for damages – a claim for the loss or damage that you've suffered as a direct result of the misrepresentation having been made.

Finally, you may also think about making a claim relating to any damage that your reputation may have suffered as a consequence. Can you show that people will recognise the work as being yours (perhaps from your individual style), or is your name printed anywhere in relation to the work? If so, you could be able to make such a claim against the publisher. All of these things are worth considering in your circumstances – whether or not you're in a position to make any (or all) of the claims depends on the precise detail of your case, and it would be advisable to seek professional legal advice.

Lee Gage is an intellectual property solicitor at leading media and entertainment firm Harbottle and Lewis LLP. He advises creative businesses on all areas of IP and IT law issues www.harbottle.com

● **OTHER RESOURCES**
Run by the UK Patent Office and authorised by the UK government
www.intellectual-property.gov.uk

The Live Art Archives: a guide to moral rights for digital artists
http://art.ntu.ac.uk/liveart/issues/chapter7.htm

In-depth US government report focusing on intellectual property
www.uspto.gov/web/offices/com/doc/ipnii/ipnii.txt

● **IMPORTANT NOTE**
This article is written in general terms and is not legal advice. Before taking any action on the basis of its contents, you should take specific legal advice. Neither *3D World* nor Harbottle and Lewis LLP will be responsible for the results of your acts or omissions that are made on the strength of this article

Making 24: The Game Part Two

Part way through the conversion of TV show 24 into a PS2 release, producer Jason-Baptiste Bolcato explains the ongoing production process

Previously on *24: The Game* ... we managed to hit our E3 target to have the first publishable levels completed and on show out in Los Angeles. It's a vital part of any game's marketing campaign, especially one that's due to ship later in the year and take place in the annual 'Christmas bun fight'.

There was no time for relaxation, though, as June was mocap month. First, we had to upgrade (polish, clean and rejig) the mocap data for the first eight hours of the game. We then produced animatics for the entire 24 hours before setting off another series of mocap sessions that would produce the next 16 hours' worth of material. Take a snapshot here and you find the game pretty much at alpha stage: all the game is there in its entirety, albeit in rough form. We had the first eight hours' worth of action and cutscenes locked down, with the rest sketched out as animatics, and the mocap for those firmly underway. During July and August, we ignored the good weather and concentrated on upgrading the 16 hours' worth of mocap we had on our servers.

We structured the *24* team as follows: three character artists, nine animators, 15 environment artists and three video editors, all overseen by a lead artist, creative director and producer. Nearly all of the disciplines were involved in game-side artwork as well as movie production, the latter generally commencing towards the back end of the schedule. The character artists were responsible for the generation of all of the game's characters, both at game and cutscene resolution, and also generated the body and facial rigging from a generic template. Our animation team provided mocap support and performed facial animation and lip-synching. They were also responsible for creating the camera motion and depth of field, as directed by the storyboards. This was particularly crucial in creating the look and feel established by the TV show. The environment artists generated props and the entire stage set where all the action takes place. In many cases, this is the same as the game environment, while other locations are specific to the cutscenes, generated to fit to the specifics of the mocap sessions.

Once all of these elements had been created, the data was passed to the game engine, which generated a video stream output. We used the game engine at this stage because it aided visual continuity, particularly in the area of lighting. Unlike many other projects, with *24*, there followed an additional stage whereby the show's trademark multi-pane views were generated. Each of the individual video streams was taken into *Adobe Premiere*, then scaled and animated to create a single concatenated output. Once this final video had been approved for timing and content, a postproduction pass of special effects could be added before it was handed to the audio department for the addition of foley, subjectives and music.

PROBLEMS OCCURRED WHEN CHARACTERS NEEDED UPGRADING AFTER FOX INPUT

Objects, characters and all environments were built with *Maya*. Level maps were built to a basic standard, with a little texturing added to get the game up and running. Environment details were then modelled in and a lighting pass added to provide depth and shadows. Character heads were built using a template system that incorporated all the facial and UV information. This template could then be easily manipulated to create new heads by moving, scaling and rotating a series of localised clusters on the head. The final head mesh could then be added into a blendshape list to become the basis for a new character. It all worked fairly smoothly, though problems sometimes occurred when characters needed upgrading after Fox broadcast input, as this sometimes just broke the facial system.

The locations have been taken exactly from the show, as we had access to blueprints and floor plans from Fox. For an environment such as the CTU building, we had detailed reference material for the main area, and we built around this to create the whole building with

● Continuity between cutscenes and the game environment is vital. You don't want to find the bonnet still attached to that SUV in the next shot

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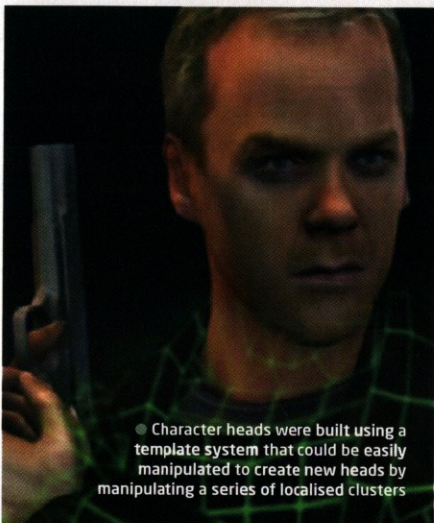
● Character heads were built using a template system that could be easily manipulated to create new heads by manipulating a series of localised clusters

● Photographs were taken throughout the LA area to build realistic sets, which the team then happily started blowing up

TIMELINE

JUNE 2005
Mocap for the first eight hours of the game is upgraded. Having hit the E3 deadline, the team goes back into the data to clean it up and make it pristine and perfect, also exaggerating and speeding it up for gameplay purposes

JUNE 2005
Animatics for all 24 hours are completed. With the first eight hours of the game complete, SCEE fleshes out the bones of the storyboards with animatics and takes the game on to the alpha stage

JUNE 2005
Using the animatics as a guide, the team undertakes the mammoth mocap sessions required to capture all the data for the final 16 hours of the game

JULY-AUGUST 2005
Upgrading mocap for final 16 hours. Same as before, only more of it!

SEPTEMBER 2005
Facial, lighting and SFX work begins. We'd love to tell you more, but as SCEE is in the middle of the process at the moment, it's all a bit fraught. More next month!

---

linking floors and corridors. Photographic material was also obtained to ensure detailed texturing and lighting. Other environments were built by gathering photographs from actual LA locations that we thought would best match our game concept. Filters and lighting were added to match the show style.

JOINING POINTS

With a game this size, keeping track of what and who is where and when is vital, so masses of cross-referencing between the design documentation and the storyboards is going on. Given that the story arc has already been fully described in the script, the joining points between gameplay and cutscenes can be clearly established and defined in the design document. Thus, if Jack finishes a level in a car, we'll already have defined the type and colour of the vehicle and this will feed into the start point for the cutscene. Similar attention is placed on characters, including their costumes and any items of equipment they may possess.

Specifically using the game environments to generate the cutscene sets also aids with continuity, as it helps to reduce any discrepancies between the game-to-video cut. Of course, being a game, and therefore under player control, it's often impossible to know the exact positions of characters and objects at the end of a sequence. Normally, the cutscene will be generated as a best guess for these details, and the use of a camera cut taking the user from his or her 'last seen position' to a new location is employed to fool the eye that the scenes are the same. Finally, regular reviews examining game transitions are undertaken to spot any discrepancies, and the game is reviewed as a whole to check narrative flow and details such as lighting set-ups that change during the course of the 24-hour period.

Next on Making 24: The Game ... lighting, postproduction, the addition of audio (in other words, everything you need to know to throw Jack Bauer's life into turmoil)

PLAY 24: THE GAME
● Developed for PlayStation 2 by SCEE's Cambridge studio, 24: The Game is due for release in November. More information can be found online at the URL below. www.24-thegame.com

● The concept of virtual sets was new territory for the makers of *Bye Bye Blackbird*

Michael Wolf

3D World heads to Germany to talk to Michael Wolf – one half of the duo behind VFX studio, Gadget – about LightWave, his first feature film and his new memory-saving commercial plug-in **BY BEN VOST**

Please tell us a bit about yourself

I've been running a small VFX company, Gadget, with my partner Michael Starzmann for the past eight years, and I'm starting to build up a second company called db&w with Dagmar Bornemann, which is more focused on software development.

What specification of machine do you work with?

I use a Dual Xeon 3.06 with 2GB of RAM and an Nvidia GeForce FX5900. We also have a render farm of five Dual Athlon MP 2100s.

● Compositing (using Digital Fusion 4) played a large part in the film's look

Are there any plug-ins you wouldn't be without?

My own (*infiniMap*). *FPrime* has totally changed the way I work, so this would be top of my list. We also use the OpenEXR I/O plug-in from Rainmaker on every project. I don't like to rely on plug-ins too much, though. I tend to use a fairly out-of-the box *LightWave 3D*.

How did you get the job on *Bye Bye Blackbird*?

I bumped into Christopher Schmitz, the VFX Supervisor for the film, at IBC. He told me he had a cool project lined up and would get back to me. Of course, I didn't believe a word of it, so you can imagine my surprise when he actually called me two weeks later!

What was your role on the film?

We had plenty of different tasks on *Bye Bye Blackbird*: retouching, matchmoving, 3D set extensions, compositing and so on. The main shot involved 3D clouds and a steel girder bridge, modelled in *LightWave*, as well as real-action bluescreen footage of actors. We also did a shot of a fully CG blackbird, and plenty of matte paintings (by Michael Hackl, **www.cania.de**) needed to be composited.

Were the shots you did heavily post-processed?

They all went through compositing. The 3D shots were rendered out in up to 10 different layers. We also had to match colours and grain

● Although the actor is sitting on a block, the set around him is completely digital

● The establishing shot of the bridge was Gadget's main task, and took up most of its time while working on the film

● The hardest task was matching the digital to the physical without the aid of precise measurements

● This globe is mapped with 4GB of imagery and was rendered on a machine with 512MB of RAM using *infiniMap Pro*

to the live-action footage. The final colour grading was done for us by Optical Art in Hamburg.

What did you use for the compositing?

We used *Digital Fusion 4.04*, which unfortunately doesn't have a 3D workspace like *Fusion 5*. This project was also the first project where we moved our pipeline over to OpenEXR, so everything was rendered and composited in floating-point colour space.

And the tracking?

We used *SynthEyes* for the matchmoving. It behaved remarkably well and once you get used to it, you can work extremely quickly with it. It's a well designed tool. I've used it since on a couple of other projects and I'm very pleased with the results.

How long did the project take?

It took us six months from the first production meeting to the final delivery. There were some delays in the editing though, so we didn't work on the movie continuously during that time. Myself and Michael Starzmann at Gadget worked on it, as well as some people at Magic&More in Hamburg. We also had great support from Michael Hackl, who did painstaking wire removal at four frames per hour.

Where can we see *Bye Bye Blackbird*?

It's only had a very limited release at the moment, but it's been seen at Cannes and it won three prizes at Taormina: Best Cinematography, a critic's prize and a public prize, too. It's a tragic love story that's set in a circus at the turn of the century.

How is working on a film different to the work you've done for television?

At the current speed of processors, TV work is a piece of cake because you have quicker feedback. Most of the TV work we do is also more design-oriented, while film work tends to be about invisible effects. Film or HD is better to work on. I was blown away when I saw my first film shot on the big screen. TV work just doesn't do that for me.

Have you changed the way you watch films now that you've worked on one?

Well, I do see things that the average movie-goer doesn't see, but I think that comes from working in the VFX industry in general. That's

a price I have to pay, since it does take away a lot of the enjoyment in seeing a movie. *Lord of the Rings: The Fellowship of the Ring* is a good example. I noticed some blue fringing on one of the shots halfway through and that really spoiled the next 30 minutes! Nobody else seemed to notice it though, which shows how much you can get away with. Obviously, the big screen is less forgiving than TV work, but this is quickly changing with HDTV coming up.

Could you tell us about *infiniMap*, the plug-in you're currently developing?

infiniMap Pro is the commercial version of a plug-in that I've been providing for free. It enables you to use an image of any size as a texture within *LightWave*, regardless of the amount of RAM your machine has. Even with 64-bit coming up, I think this is important technology for *LightWave* users. I just don't see why you should upgrade your RAM to render small parts of huge images.

What kind of users would need *infiniMap*?

Well, some of our customers are engineers or architects who need to visualise buildings on large-scale terrain, and they use satellite imagery as a base texture for the ground. Another area is sporting events that happen on a large geographic location. We have special effects, of course, like the rendering of extremely high-quality globes or planets, but *infiniMap Pro* is versatile enough to almost completely replace image texturing within *LightWave*. Any users with hi-res imagery who run out of RAM for rendering can profit.

What have you always wanted to learn in *LightWave* and never have?

How to do a decent character rig that doesn't fall apart as soon as you look at it. While I've dabbled with rigs, I never managed to create one I was really happy with. It either didn't provide enough control, or was too slow if it did. I know *LightWave* well, but I never had the patience to really dig in deep to figure everything out – IK Booster and the new dope sheet being prime examples.

What are you working on now?

I'm currently finishing off *infiniMap Pro* (**www.infinimap.com**), which is my first commercial plug-in for *LightWave*. This is great fun and we have some amazing beta testers to work with. I do the occasional small project, such as animations for exhibitions or product visualisation – nothing too spectacular at the moment! ●
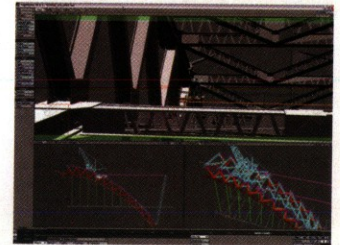
MORE INFORMATION

Find out more about Michael Wolf at **www.gadget.de** and **www.db-w.com**

ABOUT THIS ADVERTORIAL

This story was created by NewTek Europe in partnership with *3D World* magazine. Read the full version in the Community section of the NewTek website at **www.newtek-europe.com**

■|■ Joshua Beveridge was inspired by *Monsters Inc* when planning this angelic, almost fairytale-style opening scene

■|■ What is that scary noise? If in doubt, hide under the sheets (or a superbly animated patchwork quilt)

SHOWREEL

THINGS THAT GO BUMP IN THE NIGHT BY JOSHUA BEVERIDGE

One of the highlights of Siggraph was this beautifully animated two-minute gem, beginning in the cutesy territory of Pixar but ending up somewhere very different

THE PITCH

SYNOPSIS
An innocent infant finds that monsters aren't the only terrible things that go bump in the night

LOOK OUT FOR
0:17 The baby's nose twitches as light falls on his face
0:30 A nod to *Jurassic Park* as the milk in the glass starts to tremble
0:36 What's that shadow over the bed?
0:59 Behind you!
1:05 A monstrous roar
1:19 Seeing a different kind of bedroom horror
1:34 Baby: I'm gonna barf
1:40 Traumatised for life!

SEE ALSO
• The opening scene of *Monsters Inc* (2001), Pixar
• The opening scene of *The Polar Express* (2004), Sony Pictures Imageworks

When you're starting out in the rather hit-and-miss world of animated shorts, one way to ensure that your work grabs attention is to build your film up to a really great gag. Then, of course, you can show off your outstanding character animation skills. But it takes chutzpah to make a student film that visually references CG blockbusters. You have to make something that both evokes Pixar and DreamWorks and stands up to comparison with them, before topping it all off with an unexpected twist worthy of *South Park*.

"I was trying to get as much into two minutes as possible," says Joshua Beveridge, who made the impressive short film *Things That Go Bump in the Night* for his senior year thesis at Ringling School of Art and Design in Florida. "I was definitely pulling ideas from *Monsters Inc* – I'm a huge fan of Pixar – and *The Polar Express*, and at the beginning I wanted to set up a kind of nostalgic feel. This film could be happening on Christmas night – it's a night of magic, there's something in the air and you don't quite know what it is."

It turns out to be something very nasty for the film's baby hero, who flees a night-time terror only to encounter something far worse. "There's this awkward, uncomfortable humour at the

end," Beveridge concedes, "and I don't think most people laugh until they see the dedication in the credits."

MAKING BABIES
As with all great cartoon characters, it's the reaction of the baby to his situation that brings the film to life. "I just doodled and doodled. I wanted it to be adorable - a Disney/Pixar cute child," Beveridge says of his main character. Finessing the baby's expressions was always going to be vital. "I spent a good two months setting up the character to make all those expressions, trying to get them to tell the whole story," he explains. "I used a combination of both joint-rigged facial expressions and purely sculpted shapes to make a broad range of blend shapes, with lots of in-betweens to get natural arcs in facial movement and maintain the speed I wanted. The joint-rigged system gave me a big expressive range and strong arcs, but you can't beat blend shapes for fine-tuning the details."

Beveridge had already done some smaller tests in his course, building and rigging characters. "It was a matter of taking everything I'd learned from them and putting it all into this kid," he says. When it comes to facial animation, Beveridge's amp-it-up philosophy is close to Nigel Tufnel's in *This Is Spinal Tap*. "What I discovered about facial expressions is you have to go for much bigger expressions than you would ever actually need to

Beveridge's course tutors helped out where they could - one even lent him his son for the baby's voice
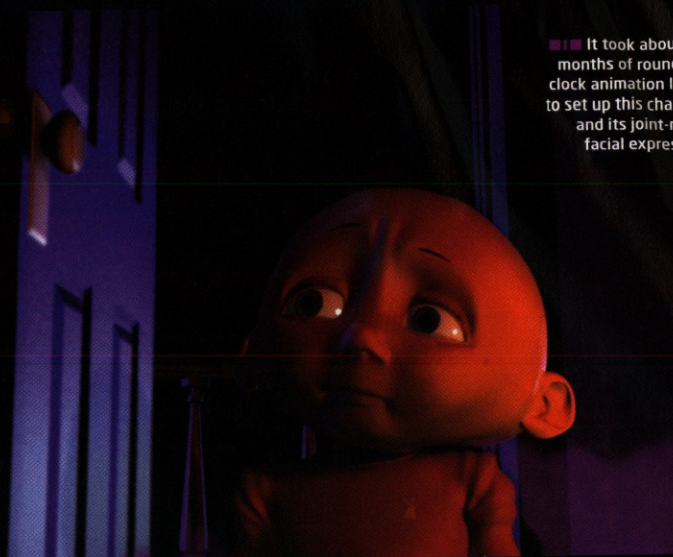
It took about two months of round-the-clock animation labour to set up this character and its joint-rigged facial expressions

RESUME

NAME
Joshua Beveridge

AGE
23

WEBSITE
www.rsad.edu/~jbeverid

BASED
LA, California

CAREER HISTORY
• 2001-2005
Computer animation student at Ringling School of Art and Design, Florida
• 2004
Summer internship between junior and senior years in Electronic Arts Tiburon, Orlando
• May 2005 onwards
Working at Sony Pictures Imageworks, LA, on character animation for *The Chronicles of Narnia: The Lion, the Witch and the Wardrobe*

use. Even if you only need expressions on a scale of one to 10, it's great to work with a scale of one to 100 for digital character set-up. Never think you've gone too far!"

Not that Beveridge wasn't limited in his college-level resources – he lost a month trying to give his baby hair. "He had a gorgeous head of hair for one shot, but I realised that lighting his hair would be another college thesis altogether, because it would need to be separately lit for every single shot."

THE JOURNEY TO NARNIA

The monster that pops up in the film also changed from the original concept. "The monster was a big debate for me," Beveridge remembers. "I started out intending to make him a 2D character, so he would stand out more and clearly not 'belong' in that world. I did these studies and tests of him being traditionally animated within a 3D environment, but realised that I'd be spending my time less on animation and more on painting alpha channels, which would limit the performance in the long run. So I changed it early."

In the event, Beveridge had much less time to work on the 3D monster than he would have liked. "I just had to slap him together and make him work as fast as possible," he admits. "It was a big crunch to get it done, so simplicity was essential. I was definitely amused with how phallic he ended up! It was intentional, but it was only a last-minute idea in the character design. Originally, I designed the monster to be an amorphous blob of imagination, but when he had to become tangible for the purposes of 3D modelling, he changed. He now treads an awkward line between being very perverse and very cute."

Which is a pretty good description of Beveridge's film as a whole. *Things That Go Bump in the Night* feels astoundingly breezy and effortless when you watch it, but for Beveridge

it was "nine months of working 12 to 15 hours every day, including my birthday and Christmas." Happily, the toil paid off, with Beveridge recruited by Sony Pictures Imageworks to work on *The Chronicles of Narnia: The Lion, the Witch and the Wardrobe*. Amazing how a naughty cartoon can get you a gig on a wholesome family fantasy! ●

WATCH THE MOVIE
You can see *Things That Go Bump in the Night* on the Ringling School of Art and Design website at **www.rsad.edu/ portfolio/ca.php (the first screenshot on the second row)**

"I DESIGNED THE MONSTER TO BE A BLOB OF IMAGINATION. HE NOW TREADS A LINE BETWEEN BEING PERVERSE AND CUTE"
JOSHUA BEVERIDGE, CREATOR OF THINGS THAT GO BUMP IN THE NIGHT

FACT FILE
• **Title:** *Things That Go Bump in the Night*
• **Running time:** Two minutes, one second
• **Budget:** N/A (made on college equipment)
• **Funding sources:** Ringling School of Art and Design, Florida
• **Time taken:** Nine months
• **Software used:** *Maya, Photoshop, Corel Painter 8, Shake, Premiere, Acid* (for sound effects and layering)
• **Hardware used:** Standard HP PCs
• **Public screenings:** 2005 Student Academy Awards (Bronze Medal winner), Siggraph 2005 (Electronic Theatre), Prix Ars Electronica Festival

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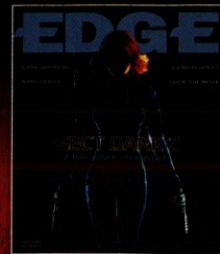
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Rare's 32-player firstperson shooter steps out of the shadows...

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INSPIRATIONS

Independent filmmaker **Garry Marshall** reveals his awe for the directorial genius of Hayao Miyazaki on My Neighbor Totoro

'THE FIRST TIME I saw *My Neighbor Totoro* (*Tonari no Totoro*), I was absolutely stunned by it. I'd never seen anything like it at all. It's an incredible and perfect film and I feel there's nothing you could add or take away from it. The story is very simple, as director Hayao Miyazaki [who also directed *Howl's Moving Castle*] deliberately set out to make a film that didn't have all the traditional storytelling conflicts in it.

"There are some wonderful sequences, such as the 'Cat Bus', which you really buy into! And the scene when the little girl, Mei, and the Totoro fly through the air like a spinning top. There there's the scene where the girls are waiting for their father to arrive and it becomes dark and begins to rain – the way the rain is painted perfectly portrays the sensation of being out in the countryside at night. You can almost feel the earth and smell the air.

"I appreciate things about nature and have a fascination with landscapes, so I really admire that sort of quietness and fully appreciate the director taking the time to put these things in. I've really held on to that.

"If somebody asked me why I went into animation, the reason probably is *My Neighbor Totoro*. It really is one of the best animated films ever made. I think it's dismissed by a lot of people as a kids' cartoon, but it's a really important piece of work. The storytelling is so clear and so visual, and there's an astonishing warmth about the film. Miyazaki observes the world of the characters with such detail and brings so much depth to the film.

"Once you've seen *Totoro*, you actually feel quite inspired that somebody can pull all these things off simultaneously. Usually, you can get one or two things right, but you don't usually get everything right in one film! I think you have to be a genius like Miyazaki to be able to achieve it."

Garry Marshall is a graphic-illustrator-turned-animator and independent filmmaker. After several successful short films he is now writing a sci-fi script for a feature www.roguefarm.com

● Hayao Miyazaki's anime masterpiece *My Neighbor Totoro* is filled with some of the most memorable characters the director has ever created, including the magical Totoro and the grinning NekoBasu (Cat Bus)
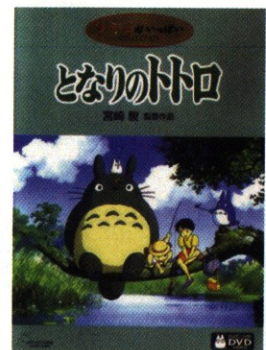
SEE FOR YOURSELF
My Neighbor Totoro was released in Japan in 1988 and in the US in 2004. The film has never been released theatrically in the UK. The DVD release from Studio Ghibli and Buena Vista Japan includes the original Japanese and English-dubbed versions, as well as English subtitles. The movie (search under *Tonari no Totoro*) can be ordered from www.jlist.com

DAZ Studio

3D World exclusive

PC / MAC Create high-quality digital artwork with this new 3D figure-posing application

AVAILABLE FOR THE first time on a magazine coverdisc, *DAZ Studio 1* is a free software application that enables you to create digital artwork quickly and easily. Primarily used for character-based projects, the package can also load in models of animals, vehicles, buildings and a whole range of other props for the creation of fantastic 3D scenes.

As well as the core application and base content, this CD includes two plug-ins – *Power Pose* and *Primitives* – along with the software manual in PDF format. To get you started, the software includes two preconfigured scenes ready for you to load and render – just double-click the scene thumbnails and everything will appear on the screen already posed, lit and ready to create a render.

Once you've mastered the basics, you can get to grips with the software's advanced features – including advanced surface editing tools, the *RenderMan*-compliant 3Delight render engine, and powerful scripting support – with the help of developer DAZ Productions' online tutorials, available from the website below. You can also find Laurie Stanley's *DAZ Studio* Q&A on page 68 of this issue.

3D World readers can upgrade from the copy of *DAZ Studio* on this CD to the *Bryce 5.5 Starter Bundle* for less than $75, which is a saving of 30 per cent on the normal purchase price. For details, turn to page 52 now!

www.daz3d.com

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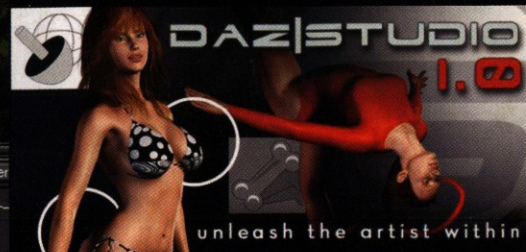
FORMAT
PC / Mac

MINIMUM SYSTEM
Mac OS X 10.3 or Windows 98SE or above, 700MHz processor, 256MB RAM, OpenGL graphics card with 128MB of onboard RAM

DEVELOPER
DAZ Productions

WEBSITE
www.daz3d.com

USING THE CD

GETTING STARTED
On a PC, this CD should autorun when inserted into your CD drive. If not, run '3dw.exe'. To toggle autorun on and off, use the Control Panel on your computer. On a Mac, choose 3DWiClassic or 3DWiOSX to suit your operating system.

USING THE INTERFACE
The disc interface requires Windows 98, Me, 2000, XP or Mac OS 8+. You'll also need an active internet connection to make full use of the interface. For best results, ensure you're using a version 3 web browser or better.

POINTS TO NOTE
• Some software may require free registration over the internet or by phone.
• Some software may not be available in all territories.
• Values quoted are the original prices for which the software was sold (including all packaging and manuals).

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Over 70 similar models are available for purchase from the Silver-Wings.co.uk website itself. Each one is listed with full poly, vertex and material counts, and most come in a range of standard formats, including 3DS, MAX, LWO and C4D. Models from the collection have been used in a range of professional projects, including broadcast documentaries and consoles located at the Milestones of Flight exhibition at the UK's Royal Air Force Museum.

www.silver-wings.co.uk

FACTFILE

FORMAT
MAX

MINIMUM SYSTEM
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DEVELOPER
Silver-Wings.co.uk

WEBSITE
www.silver-wings.co.uk

FULL CD CONTENTS | What's on the 3D World disc this issue

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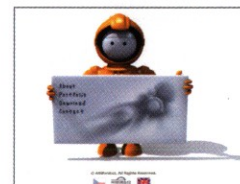**WORTH OVER $750**
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www.kurvstudios.com

OTHER RESOURCES
OVER 100 TEXTURES
This collection of over 100 JPEG-format photographic textures comes courtesy of AllWorld.cz. (Regular readers may recognise the website from co-founder Michal Kotek's artwork, which featured in our Exhibition section in issue 69.) Along with an impressive portfolio, the site features a set of downloadable resources.
www.allworld.cz

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SUPPORTING FILES
Full-size screenshots, project files and other resources to accompany the tutorials and Q&As printed in the magazine this issue
Magazine contents: page 4

TROUBLESHOOTING

THIS IS A FUTURE TECHNOLOGY CD-ROM. This disc has been thoroughly scanned and tested at all stages of production, but - as with all new software - we still recommend you run a virus checker before use and have an up-to-date backup of your hard drive. While every effort has been made to keep this CD virus-free, Future Publishing Ltd cannot accept responsibility for any disruption, damage and/or loss to your data or computer system that may occur while using this CD or the programs and data on it. Consult your network administrator before installing software on a networked PC.

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